Regional Municipality of Ottawa-Carleton Transportation Department May, 1984

official plan review

DISCUSSION PAPER

TRANSPORTATION COMPONENT

OF THE

REGIONAL DEVELOPMENT STRATEGY

TABLE OF CONTENTS

I.	Introduction	page 1
II.	Travel Needs	page 5
III.	Evaluation	page 16
IV.	Network Requirements	page 41
V.	Transportation Issues	page 49
VI.	The Transportation Strategy: Summary	page 70
	Appendices	page 72

LIST OF TABLES

1. Planning Area Travel Forecasts Average Weekday 24 hour Person Trips — page 11

2. Planning Area Travel Forecasts Average Weekday PM Peak Hour Trips — page 12

3. List of Evaluation Categories and Criteria — page 17

4. Transitway Improvements and Costs — page 23

5. Road Improvements and Costs to Meet Existing Needs: Inside and Through the Greenbelt — page 24

6. Road Improvements and Costs Within Growth Areas: Inside and Through the Greenbelt — page 29

7. Road Improvements and Costs Within Growth Areas: East Urban Community — page 30

8. Road Improvements and Costs Within Growth Areas: West Urban Community — page 31

9. Road Improvements and Costs Within Growth Areas: South Urban Community — page 32

10. Summary of Improvement Costs by Option — page 34

11. Central Area Employment and Transit Person Trips if Revised Policy Guideline Modal Splits are Achieved — page 59

LIST OF FIGURES

1. Planning Areas Referred to in the Official Plan Review — page 3

2. Population-Employment Distributions Official Plan Review Growth Options — page 6

3. Screenlines Used in the Official Plan Review — page 18

4. 1981 Observed Modal Splits and Current and Revised Policy Guideline Modal Splits (PM Peak Hour Outbound) — page 56

5. Cost versus Volume to Capacity Ratio — page 65

I. INTRODUCTION

Purpose

The Regional Municipality of Ottawa-Carleton (RMOC) prepared its first Official Plan between 1970 and 1974. Since that time, economic growth has slowed considerably and the anticipated population levels have not been attained. There also have been changes in the structure of the general population and in the composition of the labour force.

All of these factors have significant implications for future land use needs and support service requirements. To assess these implications, the Region has undertaken a review of its Official Plan. An important aspect of the Official Plan Review (OPR) concerns the implications of these factors on the existing and proposed regional transportation services. The transportation aspect is the subject of this report.

The report outlines travel needs at different growth rates. The effects on the transportation networks of several future land use options are compared and evaluated. The proposed transportation networks described in Schedules C, D and E of the current Official Plan then are reviewed, based on this

evaluation. Requirements for improvements to the road and transit networks are identified.

The report also discusscs transportation issues raised during the OPR. This discussion and the review of the transportation networks are used to develop a transportation component of an overall Regional Development Strategy. The major findings are summarized in part VI of this report. The reader is referred to the Regional Development Strategy report for an overview of the main points of the Official Plan Review.

Planning Area

The Ottawa-Carleton planning areas studied in the OPR are shown in Figure 1. Of relevance to this report are the West Urban Community (Kanata), the East Urban Community (Orleans), and the South Urban Community, each situated outside the Greenbelt. Frequent reference is made to the Ottawa Central Area (bounded by Bronson Avenue, Gloucester Street/Laurier Avenue, King Edward Avenue, St. Patrick Street, and the Ottawa River) and to the Ottawa Greater Central Area (bounded approximately by the CPR tracks on the west, the Rideau River

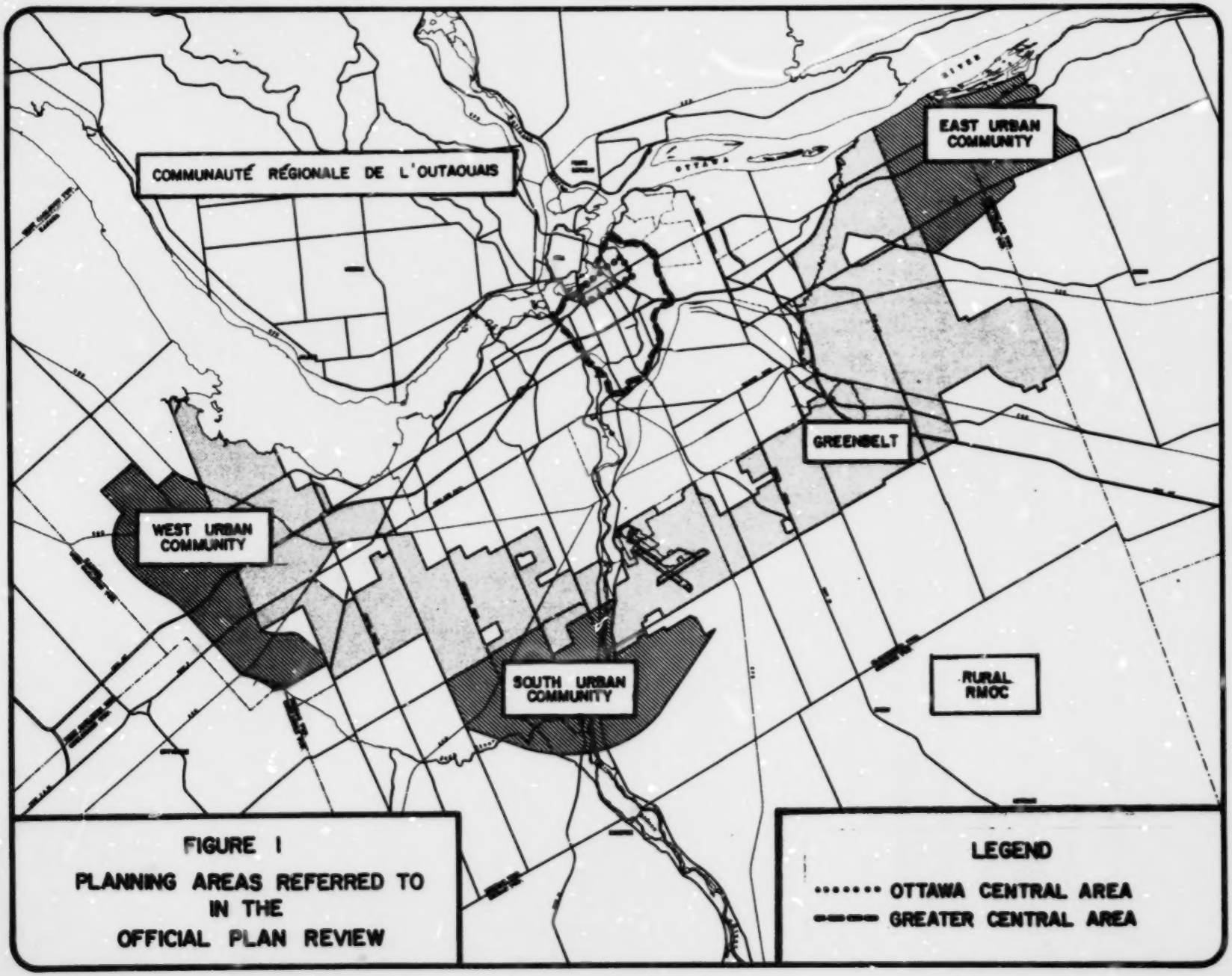


FIGURE 1

PLANNING AREAS REFERRED TO IN THE OFFICIAL PLAN REVIEW

on the south and east and the Ottawa River on the north). The rural parts of the Region also are considered. Finally, although it is beyond the jurisdiction of the Region, the Communauté régionale de l'Outaouais (CRO) must be accounted for since a significant portion of the Region's travel originates in (or is destined to) the CRO.

II. TRAVEL NEEDS

Requirements for road and transit facilities and objectives for transit usage were based largely on travel demand forecasts. Two planning horizons were examined in the OPR, namely 1991 and 2001, with emphasis on the latter. Fifteen land use growth options were developed (see Figure 2). They were distinguished by different distributions of population and employment. The options were divided into two groups according to high or low levels of growth. That is, the two groups described a reasonable range of demographic projections. The high growth options projected 723,000 people and 443,000 jobs in the Region by 2001, while the low growth options projected 623,000 people and 353,000 jobs in the Region by 2001. In 1981, the reference year for the study, the Region contained 546,900 people and 293,700 jobs.

a. Options Tested

Seven options were selected as representative of the range of options and were tested using the Region's travel demand forecasting model. Six high growth options

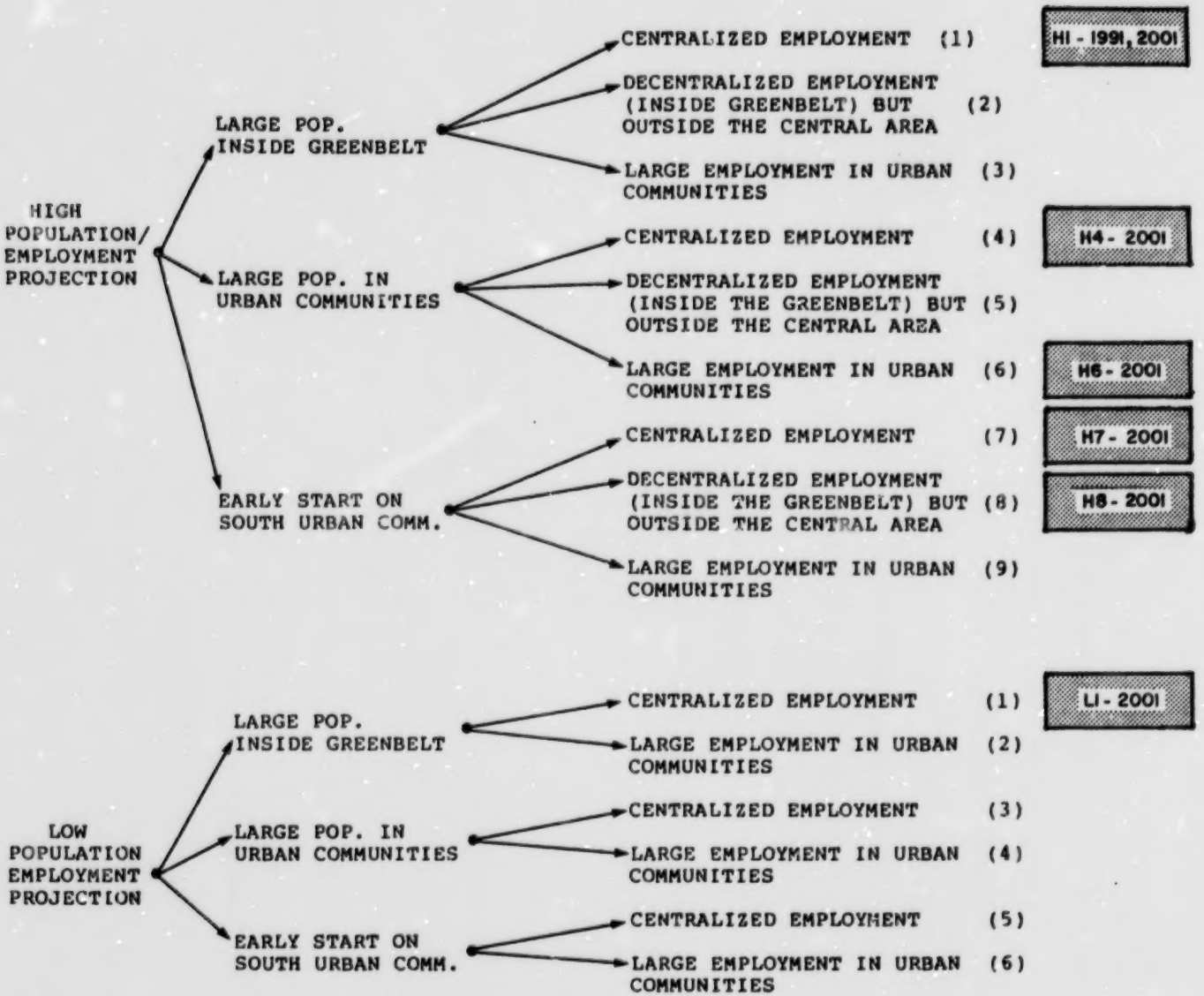

HIGH POPULATION/ EMPLOYMENT PROJECTION
LARGE POP. INSIDE GREENBELT
LARGE POP. IN URBAN COMMUNITIES
EARLY START ON SOUTH URBAN COMM.
CENTRALIZED EMPLOYMENT (1)
DECENTRALIZED EMPLOYMENT (INSIDE GREENBELT) BUT OUTSIDE THE CENTRAL AREA (2)
LARGE EMPLOYMENT IN URBAN COMMUNITIES (3)
CENTRALIZED EMPLOYMENT (4)
DECENTRALIZED EMPLOYMENT (INSIDE THE GREENBELT) BUT OUTSIDE THE CENTRAL AREA (5)
LARGE EMPLOYMENT IN URBAN COMMUNITIES (6)
CENTRALIZED EMPLOYMENT (7)
DECENTRALIZED EMPLOYMENT (INSIDE THE GREENBELT) BUT OUTSIDE THE CENTRAL AREA (8)
LARGE EMPLOYMENT IN URBAN COMMUNITIES (9)
H1 - 1991, 2001
H4 - 2001
H6 - 2001
H7 - 2001
H8 - 2001
LOW POPULATION EMPLOYMENT PROJECTION
LARGE POP. INSIDE GREENBELT
LARGE POP. IN URBAN COMMUNITIES
EARLY START ON SOUTH URBAN COMM.
CENTRALIZED EMPLOYMENT (1)
LARGE EMPLOYMENT IN URBAN COMMUNITIES (2)
CENTRALIZED EMPLOYMENT (3)
LARGE EMPLOYMENT IN URBAN COMMUNITIES (4)
CENTRALIZED EMPLOYMENT (5)
LARGE EMPLOYMENT IN URBAN COMMUNITIES (6)
L1 - 2001

FIGURE 2. POPULATION AND EMPLOYMENT DISTRIBUTIONS OFFICIAL PLAN REVIEW GROWTH OPTIONS
(Options tested identified by shaded areas)

were tested. It was felt that these six would show the most significant differences among the high growth options. All but one of the six were tested at the 2001 planning horizon, which was seen as the most critical of the two horizons with respect to transportation needs. That is, at the 1991 horizon, it was felt that the differences among the options would be relatively small. The same rationale was applied to the low growth options, at both planning horizons. Thus, only one low growth option was tested.

The transportation implications for the other options were interpolated from these seven options. The seven options are identified in Figure 2 by the shaded areas. The six high growth options tested were the following:

(1) H1, characterized by a large population inside the Greenbelt, in combination with centralized employment, concentrated in the Central Area. This option was analyzed for 1991 and 2001 (two tests).

(2) H4, characterized by a large population in the East and West Urban Communities and centralized employment, concentrated in the central area. This option was analyzed for 2001.

(3) H6, characterized by a large population in the East and West Urban Communities combined with large employment in these communities. This option was analyzed for 2001, and reflected the current Official Plan population and employment distribution goals.

(4) H7, characterized by an early start on the South Urban Community (in south Nepean) combined with centralized employment, concentrated in the Central Area. This option was analyzed for 2001.

(5) H8, characterized by an early start on the South Urban Community (in south Nepean) combined with decentralized employment growth within the Greenbelt but outside the Central Area. This option was analyzed for 2001.

One low growth option was tested:

(1) L1, characterized by large population inside the Greenbelt in combination with centralized employment, concentrated in the Central Area. This option was similar to the H1 option (except, of course, that it had a lower growth rate), but was tested only for 2001.

In Appendix A, the reader will find population and employment forecasts by planning area for each option tested.

Clearly, the Region's travel needs are influenced by the land use policies and projections of the Communauté régionale de l'Outaouais. A single high growth forecast was provided by the CRO, with population increasing from 188,900 in 1981 to 264,000 in 2001 and employment growing from 55,900 in 1981 to 72,000 in 2001. A single low growth option was forecast at 230,000 people and 68,000 jobs in the CRO in 2001. The OPR study area (RMOC and CRO) thus contained 735,800 people and 349,600 jobs in 1981. The high growth options predicted an overall population of 987,000 and 515,000 jobs by 2001.

The low growth options forecast a population of 853,000 and employment levels of 421,000 by 2001.

In this report, each of the options tested is referenced by the combination of RMOC and CRO forecasts analyzed. For example, the H7/H combined the RMOC's H7 option with the CRO's high (H) forecast, while the L1/L option combined the RMOC's L1 option with the low (L) forecast for the CRO.

b. Travel Forecasts

Given the population and employment distributions of a particular option, the associated travel on the road and transit networks was determined using the Region's travel forecasting model. The lowest and highest travel forecasts for 2001 are shown in Tables 1 and 2, along with 1981 travel.

Table 1 shows the total number of one way person trips, taken over a 24 hour period on an average weekday. This

Trip Type**	1981 Reference Year	2001 Low Growth	2001 High Growth
	Person Trips	Person Trips	Person Trips
Home based work	597,000	737,000	849,000
Home based school	145,000	179,000	206,000
Home based business	307,000	379,000	437,000
Home based pleasure and other	362,000	446,000	514,000
Non-home based	307,000	379,000	437,000
Total Internal	1,718,000	2,120,000	2,443,000
Total External	93,000	110,000	132,000
TOTAL	1,811,000	2,230,000	2,575,000

* A person trip is a trip by one person between an origin and a destination, eg, home to work, work to shop, etc. A trip from work to home which is interrupted by a stop at a store to pick up goods is two person trips.

**Internal trips are those originating in and destined to points within the RMDC or CRO. External trips may originate in or be destined to points outside the two regions (i.e., at least one end of an external trip must be outside the two regions).

TABLE I

PLANNING AREA TRAVEL FORECASTS

AVERAGE WEEKDAY 24 HOUR PERSON TRIPS*

Trip*	1981 Reference Year	2001 Low Growth	2001 High Growth
Internal Auto Vehicle Trips	80,000	100,000	120,000
Transit Person Trips	52,000	63,000	68,000
Total Internal Person Trips	168,000	209,000	241,000
Total External Person Trips	9,000	11,000	13,000
Total Person Trips	177,000	220,000	254,000

*Internal trips are those originating in and destined to points within the RMOC or CRO. External trips may originate in or be destined to points outside the two regions (i.e., at least one end of an external trip must be outside the two regions.)

TABLE 2

PLANNING AREA TRAVEL FORECASTS

AVERAGE WEEKDAY PM PEAK HOUR TRIPS

number is expected to grow from 1.8 million trips per day in 1981 to between 2.2 million and 2.6 million daily trips in 2001.

The forecasts are classified by trip purpose. It should be noted that certain trips - notably, work trips - tend to be more conducive to travel by transit. Conversely, other trip types are more dispersed both geographically and by time of occurrence and therefore are more difficult to accommodate by transit.

Table 2 shows afternoon peak hour travel. While the 24 hour travel forecasts indicate the magnitude of daily travel, conditions are most critical during the peak hour. Thus, the design of road and transit facilities must be based on peak hour travel. The number of internal auto vehicle trips is expected to rise from 80,000 trips in 1981 to between 100,000 and 129,000 trips in 2001. Similarly, transit person trips are expected to grow from 52,000 trips in 1981 to between 63,000 and

68,000 trips in 2001. The total number of person trips in the afternoon peak hour is expected to grow from 177,000 in 1981 to between 220,000 and 254,000 in 2001.

To meet the various travel needs, while avoiding environmentally and socially disruptive or costly proposals, Council adopted three policies as discussed in the current Official Plan: The first directed new development to locations that would not require the construction of major new transportation facilities. The second accommodated travel needs by balancing the mix of road and transit facilities and maximizing the use of existing and programmed facilities. Furthermore, Council gave priority to transit over road improvements. The term "improvements" is used here to denote widenings of or extensions to existing roads or transitways and the construction of new roads and transitways.

The analysis described in this report confirms the validity of the above policies, particularly that giving precedence to transit over road improvements. The transportation strategy should encourage the use of

transit and extend, to the optimum level, the life and use of existing road and transit facilities. Finally, the transportation strategy should encourage Council's consideration of early extensions of the system of transitways to growth areas outside the Greenbelt.

III. EVALUATION

The projected travel for each option tested was assessed to determine the effects on the road and transit networks. The ultimate results of the assessment of the travel impacts were revised goals for transit travel and a list of needed road and transit improvements for each option. These results then were evaluated according to four categories of criteria as shown in Table 3.

Before discussing the evaluation categories and results, it is appropriate to define some commonly used terms. Much of the evaluation referred to travel across screenlines. A screenline is an imaginary line, drawn across one or more roads or transitways. Screenlines are located strategically throughout the study area (for example, at rivers, which may be crossed only at a few selected points) and are used as convenient points to monitor travel and discern travel patterns. Figure 3 shows the screenlines used in the OPR.

The determination of transit needs was linked to modal split, which refers to the percent of trips made by transit across a

A. System Performance Measures

I. Average Weekday Trip Length Distribution
II. Total Annual Weekday Vehicle-Hours of Travel
III. Total Annual Weekday Vehicle-Kilometers of Travel
IV. Total Annual Weekday Fuel Consumption
V. Total Annual Weekday Air Pollutant Emissions
VI. PM Peak Hour Modal Split
VII. Transit Efficiency
VIII. Accessibility
IX. PM Peak Hour Auto Vehicle Volume to Capacity Ratio

B. Financial Implications

Cost of Transportation Improvements Needed To Meet Existing Needs, and Needed due to Growth

C. Land Use Transportation Impact

I. Loss of Open Space
II. Loss of Parkland
III. Impact on Social Patterns
IV. Impact on Local Street System
V. Aesthetic Quality (compatibility with land uses)

D. Implementation

Table 3
List of Evaluation Categories and Criteria

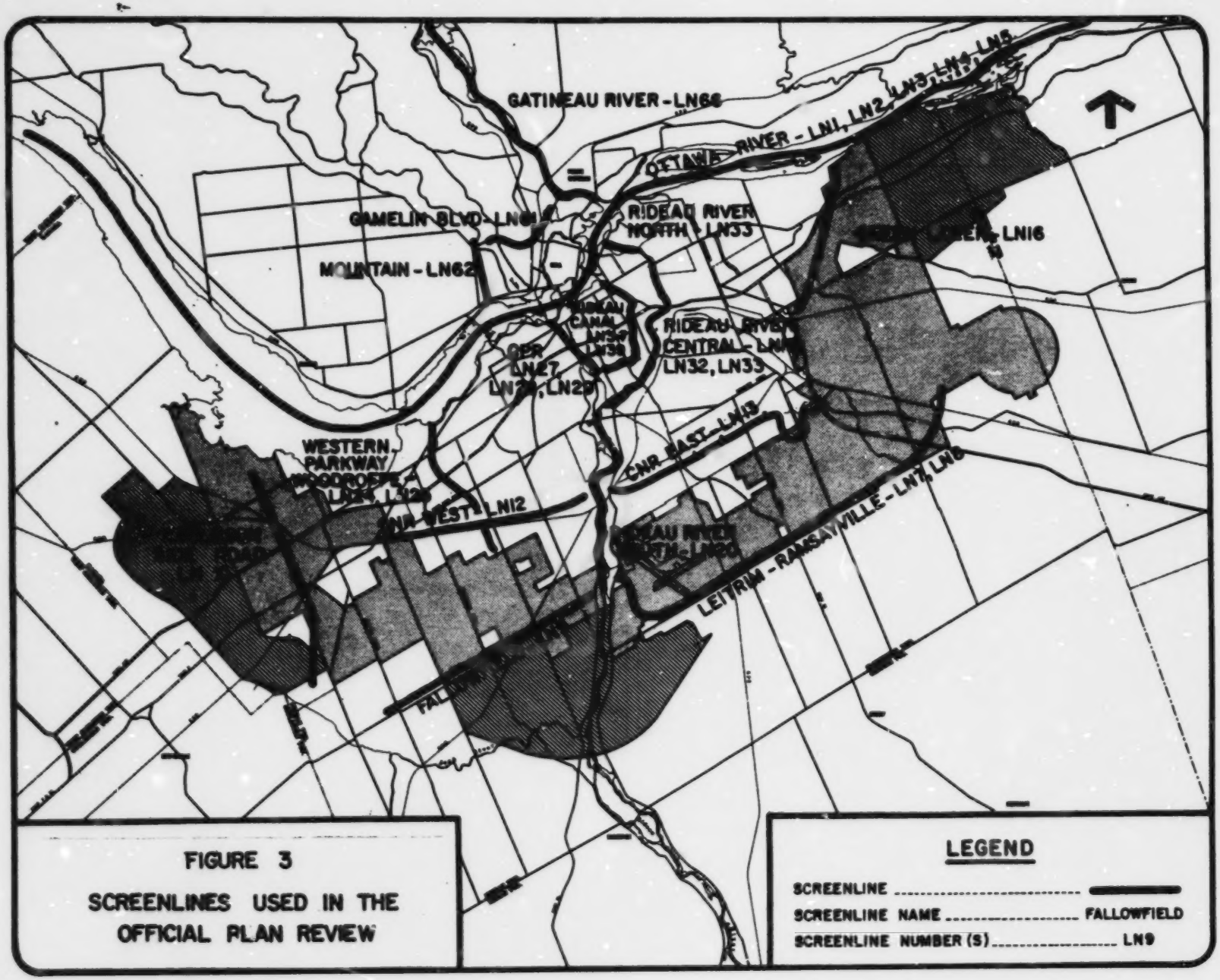


FIGURE 3

SCREENLINES USED IN THE OFFICIAL PLAN REVIEW

LEGEND

SCREENLINE ..... ▬▬▬

SCREENLINE NAME ..... FALLOWFIELD

SCREENLINE NUMBER (S) LN9

given screenline, or throughout the study area as a whole. Modal split also may be defined as transit market share. The discussion which follows also refers to policy guideline modal splits. These represent goals for transit ridership and were developed previously for the current Official Plan.

The evaluation categories and results are discussed below.

a. System Performance Measures

Several quantitative measures were used to evaluate each option in terms of travel related impacts, such as modal split, travel volumes, pollutants emitted, energy consumed, etc.

The results indicated minor differences among the options, with one important exception which measured road traffic volume to capacity ratios at each screenline. These ratios and the forecast modal splits at each screenline then were used to assess the transportation needs implied by the results of each of the tested options. Revisions were made to the policy guideline modal splits as indicated in the current Official Plan. These revisions were based on existing transit ridership trends and projected travel demand. Road capacity

deficiencies then were derived for each option, based on the screenline volume to capacity ratios and assuming the achievement of the revised policy guideline modal splits. A range of alternative improvements was generated. These improvements are detailed below, along with their financial implications. Volume to capacity ratios and modal split data are given in Appendices B and C.

b. Financial Implications

The options were evaluated according to the cost of implementing needed transportation improvements. The optimal option was that which minimized system improvement costs. Improvements thus were considered according to minimum cost; that is, the cheapest combination of alternatives. (These alternatives were considered independent of facility ownership. The inclusion here of alternatives not fully under the jurisdiction of the RMOC does not necessarily imply that commitments to their construction have been or can be made.)

Inherent in the financial estimates that follow is the realization that the costing of facilities - the ultimate alignment and size of which may not be known for several years - is subject to wide margins of error. Therefore, although these estimates provide important insight into the likely magnitude of future costs and the effect of different growth levels and development patterns on those costs, the actual figures are not intended to be taken literally. They represent instead the relative costs of improvements associated with each option.

All estimates were prepared on the basis of constant 1983 dollars and refer to gross costs (i.e., not reduced by various subsidies provided by senior levels of government).

The discussion that follows refers frequently to the proposed and conceptual road network described in Schedules C and D and to the proposed transit network shown in Schedule E of the current Official Plan. The interested reader is referred to the Official Plan for further information.

Improvements were classified in two ways:

(1) Improvements Required to Meet Existing Needs

The road and transit alternatives considered to be required to meet existing needs were derived from the Region's transportation Capital Budget (1984-1988). The road improvements were required for existing capacity or operational problems. They include some new facilities. Transit improvements (primarily the transitway program) were assessed with a balance of $200 million (as shown in Table 4), while road improvements were assessed at $155 million (see Table 5).

Although these improvements are independent of the land use options tested, their costs must be considered when the total financial burden to the Region is assessed. Therefore, costs for future growth cannot be considered without looking first at the costs mandated by current needs.

(2) Improvements Dependent on Growth

Included here were those improvements dependent

Facility and Extent of Improvement	Cost by Option (1983 $ Million)					
	L1/L	H1/H	H4/H	H6/H	H7/H	H8/H
Transitway East						
Blair Road to Montreal Road	20	20	20	20	20	20
Blair Road to Orleans	N/A	30	30	30	30	30
Transitway West						
Western Parkway to Acres Road	20	20	20	20	20	20
Western Parkway to Kanata	N/A	40	40	40	40	40
Transitway South						
Baseline to Barrhaven	N/A	N/A	N/A	N/A	0-50	0-50
Sub Total	40	110	110	110	110-160	110-160
To Meet Existing Needs	200	200	200	200	200	200
Total	240	310	310	310	310-360	310-360

N/A - Not Applicable

Table 4. Transitway Improvements and Costs

Facility	Cost (1983 $Million)
Walkley Road - widen to 4 lanes divided, Bank to Heron	3.3
Heron Road - widen to 4 lanes divided, Bank to Sandalwood	4.8
Heron/Walkley - intersection improvements and widen to 4-6 lanes divided, Sandalwood to Conroy	4.8
Walkley Road - widen to 4 lanes divided, Conroy to Russell	4.0
Walkley Extension - construct to 4 lanes divided, Russell to Hwy 417	9.2
Nicholas - Waller	0.1
Pre-engineering services - 1981, 1983, 1984	2.3
Woodroffe Avenue - reconstruct to 4 lanes divided, Norice to Baseline	1.1
Hemlock Road - reconstruct to 3 lanes, St. Laurent to Birch	0.1
Greenbank Road - reconstruct to 4 lanes undivided, Knoxdale to Banner	0.1
Kent Street - reconstruct, Catherine to Somerset	0.1
Intersection Improvments, 1984	5.5
Resurfacing program, 1984	4.2
Beechwood Avenue - reconstruct to 4 lanes, Vanier Pkwy to Corona	3.5
Montreal Road - reconstruct to 5 lanes, Bradley to Queensway	8.8
Prince of Wales Drive - reconstruct to 4 lanes divided, City Limits to Baseline	4.6
Vanier Parkway extension - construct to 4 lanes divided, Beechwood to Sussex	12.6
Bronson-Portage connection - construct to 4-6 lanes	7.8
Innes Road - capacity improvements, Tauvette to Cleroux	3.6
Riverside Drive - construct to 4 lanes divided, Smyth to Industrial	9.6
Practical Standards Program, 1984	4.0

Table 5. Road Improvements and Costs to Meet Existing Need Inside and Through the Greenbelt

Facility	Cost (1983 $Million)
Hunt Club Road - construct to 4 lanes divided, including bridge, Merivale to Bowesville	20.2
Innes Road - widen to 4 lanes divided, Hwy 417 to Blair	3.2
Hunt Club Road - construct to 4 lanes divided, Bank to Hawthorne	9.0
Blair Road - reconstruct to 4 lanes, Ogilvie to Montreal	3.0
Merivale Road - reconstruct to 4 lanes, Kirkwood to Carling	1.5
Richmond Road - reconstruct to 4 lanes, Carling to Parkway	1.5
Baseline Road - reconstruct to 4 lanes divided, RR 248 to Greenbank	5.2
Richmond Road - reconstruct to 4 lanes, City Limits to Pinecrest	2.6
Mackay Street - reconstruct to 3 lanes, Sussex to Beechwood (local)	1.1
Booth Street - reconstruct to 4 lanes divided and partial resurfacing, Albert to City limits	0.7
Merivale Road - reconstruct to 4 lanes divided, Slack to Woodfield	4.0
Meadowlands Drive - reconstruct to 4 lanes, Merivale to Fisher	1.7
Prince of Wales Drive - reconstruct to 4 lanes divided, Baseline to Preston	3.0
Fisher Avenue - reconstruct to 4 lanes, Baseline to Holland	2.1
Tremblay Road - reconstruct to 4 lanes, Alta Vista to St. Laurent	0.6
Richmond Road - reconstruct to 4 lanes, Windemere to Churchill	0.8
Fisher Avenue - reconstruct to 4 lanes, Dynes to Baseline	0.7
Total*	155

* May not add precisely due to rounding

Table 5 (continued). Road Improvements and Costs to Meet Existing Needs Inside and Through the Greenbelt

on growth. The alternative road improvements considered were as follows:

a. Improvements to existing facilities (i.e., beyond "existing" needs)

b. New facilities already identified in Schedules C and D of the current Official Plan as proposed roads.

c. New facilities identified in secondary plans or subdivision plans of the local municipalities (for example, Campeau Drive in Kanata and the town centre Ring Road in Orleans).

d. New facilities shown in Schedules C and D of the current Official Plan as conceptual links. ("Conceptual links" are future roads whose exact locations have not yet been as clearly defined as those of "proposed roads.")

e. New facilities needed to meet an identified travel demand, but not accounted for in the above categories.

f. New facilities needed in some communities under certain options to accommodate internal (i.e., within the community) travel.

The transit improvements were derived as follows:

a. Transitway extensions already identified in Schedule E of the current Official Plan.

b. Further transitway extensions to serve identified needs.

The improvements dependent on growth were categorized in three ways: Those internal to each urban community due to a specified level of growth, those at critical screenlines (defined below) needed if the revised policy guideline modal splits were achieved, and those that would be needed if the revised policy guideline modal splits were

not achieved. The distinction is important, because while the first category is dependent on the amount of growth in each community, it is somewhat independent of the land use option implemented. Beyond these costs (needed to support committed growth), the second category represents the costs needed to help achieve the desired transit ridership and to cater to demand at the critical screenlines. The third category indicates the additional improvements that would be needed if these levels of transit ridership were not achieved. The three categories were divided further according to growth areas (East, West, and South Urban Communities, and inside the Greenbelt). Costs for each option then were determined. Tables 6 through 9 show the costs of the new facilities required by growth area if the policy guideline modal splits are achieved by 2001. These costs do not include the costs associated with existing needs. Tables have not been prepared to indicate the consequences of not achieving these guidelines.

Not surprisingly, the L1/L option proved least costly, although it still required significant

Facility and Extent of Improvement	Cost By Option (1983 $Million)					
	L1/L	H1/H	H4/H	H6/H	H7/H	H8/H
Britannia Arterial - 2 lanes, - widen to 4 lanes	N/A N/A	20 N/A	20 5	20 N/A	20 N/A	20 N/A
Baseline Road - widen to 6 lanes divided, Greenbank to Prince of Wales	N/A	5	5	5	5	5
Blackburn Hamlet Bypass	15	15	15	15	15	15
Hunt Club Road - 4 lanes divided, Cedarview to Merivale - widen to 6 lanes	18 N/A	18 7	18 7	18 7	18 7	18 7
Hunt Club Road - Bowesville to Hwy 417	19	19	19	19	19	19
Preston - Chaudière Connection	22	22	22	22	22	22
Nicholas - Industrial Connection	8	8	8	8	8	8
Scott Street and Albert Street - Preston to Bronson	1	1	1	1	1	1
Queensway downtown corridor - collector/distributor system	7	7	7	7	7	7
Scott Street - extension to Richmond Road	3	3	3	3	3	3
Hawthorne Road - extension to Walkley Road						
St. Joseph - widen to 4 lanes divided, Queensway to Jeanne D'Arc	N/A	7	7	7	7	7
Fernbank - Richmond connection - 2 lanes - widen to 4 lanes divided	N/A N/A	6 N/A	6 9	6 N/A	6 N/A	6 N/A
Ottawa River Parkway East - 2 lanes	N/A	15	15	N/A	15	15
Regional Road 248 - widen to 4 lanes divided, through Greenbelt	N/A	N/A	5	N/A	N/A	N/A
Innes - Walkley/Hunt Club link - 4 lanes divided	N/A	N/A	25	N/A	N/A	N/A
Sub Total	95	155	200	140	155	155
To Meet Existing Needs (Table 4)	155	155	155	155	155	155
Total	250	310	355	295	310	310

N/A - Not Applicable

Table 6. Road Improvements and Costs Within Growth Areas: Inside and Through the Greenbelt

Facility and Extent of Improvement	Cost By Option (1983 $Million)					
	L1/L	H1/H	H4/H	H6/H	H7/H	H8/H
Jeanne D'Arc Blvd and Orleans Blvd - 4 lanes divided, St. Joseph to Innes	10	10	10	10	10	10
Ring Road (town centre) - full construction	5	5	5	5	5	5
St. Joseph - Jeanne D'Arc to east	N/A	2	2	2	2	2
Tenth Line - widen to 4 lanes, Innes to Highway 417	N/A	4	4	4	4	4
Regional Roads 31/47 - connection	N/A	2	2	2	2	2
Innes Road - widen to 4 lanes divided, Blackburn Hamlet Bypass to Tenth Line	N/A	7	7	7	7	7
Orleans roads	N/A	N/A	25	25	N/A	N/A
Total	15	30	55	55	30	30

N/A - Not Applicable

Table 7. Road Improvements and Costs Within Growth Areas: East Urban Community

Facility and Extent of Improvement	Cost By Option (1983 $Million)					
	L1/L	H1/H	H4/H	H6/H	H7/H	H8/H
Campeau Drive						
- 4 lanes divided	9	9	9	9	9	9
- widen to 6 lanes divided, Eagleson to Terry Fox	N/A	6	6	6	6	6
Castle Frank - 6 lanes divided, Katimavik to Campeau	11	11	11	11	11	11
Eagleson Road						
- widen to 4 lanes divided, Fernbank to Terry Fox	10	10	10	10	10	10
- widen to 6 lanes divided	N/A	10	10	10	10	10
Terry Fox Drive						
- 2 lanes, Fernbank to Eagleson	15	15	15	15	15	15
- widen to 6 lanes divided	N/A	20	20	20	20	20
Katimavik - widen to 6 lanes divided	N/A	9	9	9	9	9
Total	45	90	90	90	90	90

N/A - Not Applicable

Table 8. Road Improvements and Costs Within Growth Areas: West Urban Community

Facility and Extent of Improvement	Cost By Option (1983 $Million)					
	L1/L	H1/H	H4/H	H6/H	H7/H	H8/H
Cedarview Road - Jockvale to Fallowfield	2	2	2	2	2	2
Fallowfield - Cedarview - Woodroffe - widen each to 4 lanes divided	6	6	6	6	6	6
Greenbank - Fallowfield to Knoxdale - widen to 4 lanes divided	6	6	6	6	6	6
Woodroffe - Fallowfield to Vann - widen to 4 lanes divided	4	4	4	4	4	4
Greenbank - Jockvale to Malvern	2	2	2	2	2	2
Barrhaven roads	N/A	N/A	N/A	N/A	40	40
Total	20	20	20	20	60	60

N/A - Not Applicable

Table 9. Road Improvements and Costs Within Growth Areas: South Urban Community

infrastructure investment. However, these improvements also accommodated a large part of the subsequent growth depicted in the remaining options tested. Among the high growth options, the H1/H option incurred the least cost. The H6/H option followed closely. The cost estimates are summarized in Table 10.

It was found that improvements were needed most along the east-west corridor, regardless of whether or not modal split guidelines were achieved. The H7/H option did not significantly reduce the need for east-west improvements because of the level of growth assumed for the East and West Urban Communities. Compared with the H7/H option, the H8/H option had a slightly different travel distribution along the east-west corridor. Thus the improvements required for both options were very similar (with a few insignificant variations).

Improvements needed at a few critical screenlines generally solved capacity problems at other screenlines. (The reader is reminded that the cheapest combinations of alternatives that were considered here were independent

Improvement	Cost By Option (1983 $Million)					
	L1/L	H1/H	H4/H	H6/H	H7/H	H8/H
Roads						
- East Urban Community	15	30	55	55	30	30
- West Urban Community	45	90	90	90	90	90
- South Urban Community	20	20	20	20	60	60
- Inside or Through the Greenbelt*	250	310	355	295	310	310
Roads Total	330	450	520	460	490	490
Transitways**	240	310	310	310	310-360	310-360
Total	570	760	830	770	800-850	800-850

* Includes data from Table 5
**Data from Table 4

Table 10. Summary of Improvement Costs by Option

of facility jurisdiction. For example, the costs of programmed provincial improvements - the Queensway reconstruction, Highway 416, etc. - were not included here.)

Table 6 shows the least cost combinations of improvements needed inside and through the Greenbelt (assuming that the revised policy guideline modal splits were achieved). The critical screenlines were found to be at Green Creek in the east, at Western Parkway/Woodroffe in the west, and at CNR West in the south. The needs at each, of course, were dependent on the option. In maintaining priority to transit improvements over road improvements and to provide an appropriate transit level of service, it was found that the transitway extensions to the East and West Urban Communities should be considered under any option. An extension of the transitway to the South (Nepean) Urban Community might be considered only under the H7/H or H8/H options.

In the east, the possible road improvements that were considered included:

(1) A two lane Ottawa River Parkway East (H1/H, H4/H, H7/H, and H8/H options) between St. Laurent Boulevard and the Tenth Line.

(2) A widened St. Joseph Boulevard (all high options tested) through the Greenbelt from the Queensway interchange to Jeanne D'Arc Boulevard.

(3) A Blackburn Hamlet bypass south of Innes Road and a widened Innes Road (all options tested).

(4) A four lane extension of Walkley Road (H4/H option) through Mer Bleue to Innes Road and the Tenth Line.

In the west, the possible road improvements included:

(1) A four lane (L1/L option) or six lane (all high options tested) extension of Hunt Club Road between Merivale Road and Cedarview Road.

(2) A widened Baseline Road (all high options tested) between Prince of Wales Drive and Greenbank Road.

(3) A two lane (H1/H, H6/H, H7/H and H8/H options) or four lane (H4/H option) connection between Richmond Road and Fernbank Road.

(4) A two lane (H1/H, H6/H, H7/H, and H8/H options) or four lane (H4/H option) Britannia Parkway.

(5) A widened Regional Road 248 (H4/H option) between Moodie Drive and Eagleson Road.

No road improvements were required to the south, across the CNR West screenline. The other improvements listed in Table 6 were needed within the Greenbelt under all options.

The total costs of the road improvements inside and through the Greenbelt (assuming the revised policy guideline modal splits were met) were smallest for the L1/L option at $95 million (in addition to the costs required to meet existing needs). The greatest costs were incurred for the H4/H option ($200 million). The least cost high growth option tested was the H6/H option

at $140 million, followed by the H1/H, H7/H and H8/H options at $155 million each. Note that the above costs could vary depending on the assumed level of transit ridership and road system conditions which would necessitate the transitway extension in a given corridor.

The implications of not achieving the policy guideline modal splits were as follows: In addition to the three critical screenlines identified above, problems also were found at the Rideau River Central and Rideau Canal screenlines. The three transitway extensions still were required as before. Alternative road improvements were identified in the east, to accommodate increased deficiencies. These were generated by recombining the lane capacities of the four improvements identified earlier and included, for example, a four lane Ottawa River Parkway East.

In the west, the full (four lane) Britannia Parkway was required for all options except the L1/L option, although

for the H4/H option deficiencies would continue to exist. No road improvements were required for the south at the CNR West screenline. No alternatives were proposed for solving the problems at the Rideau River Central and Rideau Canal screenlines; such alternatives are the subject of another (concurrent) study. The greatest deficiencies were shown for the H1/H and H4/H options, while smaller amounts were shown for the H6/H, H7/H, and H8/H options.

The implications of not achieving the revised policy guideline modal splits are clear: A greater program of road improvements would be required, and deficiencies would remain for all options except the H6/H option. In addition, the loading of the road network throughout would be more severe and thus higher societal costs would be incurred.

c. Land Use/Transportation Impact

This category subjectively considered the quantity of land required for the alternatives and the social and environmental impacts associated with the alternatives. Impacts on local street systems and aesthetic quality

also were considered. Minor differences were discerned among the options tested.

d. Implementation

This category subjectively examined the feasibility of providing additional system capacity. Minor differences were discerned among the options tested.

In summary, the L1/1 option, though optimal with respect to all options, considered only a low rate of growth. Travel volumes were smaller than those associated with options featuring a high rate of growth. Thus the deficiencies were reduced as well. Of the high growth options, H1/H proved best followed closely by the H6/H option. The two options attained (as well as any other options) the current Plan's policies, thus confirming the validity of these policies with respect to the regional transportation strategy.

IV. NETWORK REQUIREMENTS

The designated road and transitway networks in Schedules C, D and E of the current Official Plan are intended as a framework for planning and design. New facilities in the Plan are designated along existing corridors; where a corridor is not readily identifiable, a new road is shown as a "conceptual link". The route alignments are approximate only. Before construction of any transportation facility along a proposed route, several alternatives would be investigated as a potential transportation solution. Following further route evaluation and consideration of local issues, conceptual links may be redesignated as primary facilities. The reader is referred to the Official Plan for further information.

The roads and transitways currently designated in the three schedules were examined during the Official Plan Review. The intent was to retain, remove, or upgrade currently designated conceptual links and add new conceptual links as necessary.

Only some of the facilities discussed below were included in the detailed travel demand model networks used for the OPR tests. Some planned facilities were included to ensure that the computerized network functioned effectively: Otherwise, several lengthy tests would have been required for each network configuration.

Because of Council's policy giving priority to transit over road improvements, the phasing and scheduling of transit improvements will determine when and where road improvements take place. The components of the transit and road network schedules are addressed below.

a. Transit Network (Schedule E)

As a result of the analysis of the tests and as discussed above, it was found that for all options tested the eastern transitway ultimately should be extended as far as the East Urban Community town centre. In the west, for all options tested, the transitway similarly should be extended to the West Urban Community town centre. Both extensions would follow the Queensway Corridor (Highway 17 in the east and Highway 417 in the west).

The southwest transitway might be extended to the South Urban Community under the H7/H and H8/H options (growth in south Nepean). This extension could follow Woodroffe Avenue south past Knoxdale Road, then would parallel the CNR tracks to Barrhaven, as far as Greenbank Road. (See Table 4.)

b. Road Network (Schedules C and D)

The facilities addressed here were classified in two main ways: Those required to meet existing needs and those dependent on growth, with the latter further classified according to facilities located inside or through the Greenbelt, intercommunity facilities located outside the Greenbelt, and facilities located within the three urban communities.

(1) Facilities Required to Meet Existing Needs

At discussed above these facilities constituted projects in the Region's current five year transportation Capital Budget and projects needed for "other" reasons. The reader is referred to Table 5. The five year road programme included realignments, road widenings, intersection improvements, and other works needed for operational or safety reasons.

Some road extensions were included, but these were not dependent on the options tested. The initial transitway system also was considered in the context of the five year programme.

The list of facilities needed to improve operations (i.e., not for reasons of capacity) included road works similar in nature to those in the five year programme, but not having as immediate a priority. The Richmond-Byron corridor section of the transitway was needed not to increase capacity, but to remove transit vehicles from the Ottawa River Parkway. Some improvements to provincial roads were needed to meet the province's planning goals or to solve existing operating and maintenance problems. These included the construction of Highway 416 and the rehabilitation of the Queensway.

(2a) <u>Facilities Dependent on Growth: Inside and Through the Greenbelt and For Intercommunity Travel Outside the Greenbelt</u>

The Queensway currently is the most heavily travelled route in the east-west corridor.

Improvements to the Queensway have been described previously. The Greater Central Area segment of the Queensway corridor, however, is the subject of another detailed study concerned with operational and traffic management aspects of the facility. Considered in the study are a downtown collector/distributor network and possible new facilities such as the Champagne Arterial and a Carling Avenue - Industrial Avenue link. A related facility is the Kirkwood Avenue extension, to be the subject of a separate study.

Highway 416 is the only new urban freeway planned before 2001. Although the highway was proposed initially to meet interurban demand, it should be stated that the growth of the South Urban Community in south Nepean was found in the OPR to be dependent on the implementation of Highway 416. Without the new highway, a number of major road widenings would be required (especially through the Greenbelt) at

great expense. It is proposed to locate Highway 416 in the Cedarview Road corridor, terminating in the north at the Queensway. As a result, the corridor (Merivale) designated for this highway in the current Official Plan may not be needed for roadway purposes.

The analysis of the test results further demonstrated that the Outer Ring Road was not needed until after the 2001 planning horizon. The need for this road is dependent on the rate of growth in the South Urban Community: That is, the Outer Ring Road may be needed to accommodate future travel between that community and both the East and West Urban Communities, in addition to acting as a bypass of the urban area.

As well, the Outer Ring Road may be used to accommodate intra-community travel within the South Urban Community. The Outer Ring Road should be retained in the Official Plan, but as a proposed major road instead of as a conceptual link, as designated presently. Council should protect the

right of way, especially at the Rideau River. Property now in public ownership should be retained, with privately held properties in the corridor being acquired as they become available.

The Inner Ring Road will be needed sooner than the Outer Ring Road, but also not before 2001. It is dependent on growth inside the Greenbelt as well as in the South Urban Community and would be needed especially to link south Nepan (or south Gloucester) with the East Urban Community. The Inner Ring Road's current designation as a major road should be retained, with right of way acquisition policies similar to those of the Outer Ring Road.

(2b) Facilities Dependent on Growth: Within the Three Urban Communities

These facilities were required to accommodate future travel demand within the three urban communities.

They are listed by growth area in Tables 7 through 9 along with their estimated costs. Note that the need for some of the improvements shown in Table 6 (inside or through the Greenbelt) may be attributed to that portion of inter-community travel that takes place within the Greenbelt.

It should be noted that some of the facilities dependent on growth will require closer examination at a later date to determine whether or not they should be designated as part of the regional road system.

V. TRANSPORTATION ISSUES

Several interrelated issues were raised during the OPR and examined from the transportation perspective. Some issues developed from the analysis of the test results. Others have bearing on various aspects of the Regional Development Strategy.

a. Planning Horizon

As noted previously, the growth options were based on two planning horizons (1991 and 2001). The analysis of the options tested indicated that the transportation strategy should accommodate planning horizons beyond 2001 for right of way protection and for infrastructure planning purposes. The need can be attributed to several factors:

(1) Transportation Service Implementation

The approval, planning and construction phases of major transportation projects typically extend over many years. Issues such as the availability of funds, competing needs, and the concerns of citizen

groups and politicians have significant influence on the staging of transportation projects. Therefore, at least some of the road and transit improvements identified in Tables 4 through 10 likely will not be completed before 2001.

(2) Life Span

The life span of a permanent transportation facility exceeds the planning horizons (1991 and 2001) considered for the growth options. That is, a permanent facility built today will still be in use long after the planning horizons have been reached. Any identified transportation improvement therefore should consider implications for post 2001 growth.

(3) Planning Horizons and Right of Way Protection Policies

The option tests confirmed the need for various road and transit improvements. Some of these improvements were seen to be needed by the time the

planning horizons are reached. The travel forecasts implied that other improvements would be needed, but not before 2001. The improvements needed beyond 2001 are conceptual in nature, and would be defined more precisely as the future demand for travel was realized. Nonetheless, there is clearly a need to consider long term right of way policies now, as elaborated below.

These factors demonstrate that it is not sufficient to consider transportation needs only up to the defined planning horizons. The Official Plan therefore should be looking ahead 30 to 50 years for infrastructure planning purposes and, where possible, to retain public ownership of currently designated future transportaton rights of way.

b. Long Term Right of Way Protection Policy

Given that needs have been identified for the post 2001 period, the transportation strategy should consider a long term right of way protection policy with due recognition of the varying needs for the right of way

depending on the specific facility considered. The issue may be expressed in terms of the trade-offs between the overall cost to society of protecting a corridor today for possible use 30 to 50 years from now versus the implications of not protecting it. The two most important trade-offs can be derived as follows:

(1) The monetary benefits and costs of acquiring a property now versus acquiring it later at an increased price.

(2) The possible constraints that can be placed on the use of a property acquired now versus the increased flexibility in its use and possible resistance to its later acquisition. It may not be possible to develop a transportation facility in the future if large structures having long life spans (for example, apartment or office buildings) have been constructed in the corridor. A right of way can be protected effectively without the immediate need for outright purchase by imposition of setbacks or land use restrictions, or by moderating development. Such methods are dependent on the specific facility being considered.

c. Policy Guideline Modal Splits

The current Official Plan gives precedence to transit over road improvements and incorporates policy guideline modal splits for future transit usage. The current guidelines refer to the modal splits at several screenlines for outbound trips (with respect to Parliament Hill) in the afternoon peak hour on a weekday.

The transportation strategy should endorse these policies and provide direction towards the achievement of the guidelines.

If the current relative level of attractiveness of transit to automobile travel were to continue, a similar proportion of travel by transit as today would result in future years. In recent years, however, transit ridership has continued to grow at a higher rate than population growth, indicating a continuing improvement in the relative attractiveness of travel by transit. This improvement cannot be attributed to one single factor but more to a range of interactive issues reinforcing the upward ridership spiral, including:

(1) Increasing ridership growth provides increased opportunity for the Transit Commission to more closely tailor service arrangements to the needs of the traveller.

(2) Economic pressures associated with a real increase in the costs of owning and operating private vehicles, particularly the second family car.

(3) Development of new urban areas in a form more compatible with efficient and attractive transit servicing than is found in some established areas.

(4) More social awareness of the environmental benefits from increased transit usage.

On the basis of current trends, many of the current guideline modal splits will be met or exceeded during the planning period being considered. With the introduction of the currently programmed transitway system, the

relative attractiveness of the transit travel alternative will be significantly enhanced.

Based upon both existing ridership growth trends and ridership growths associated with other transit level of service improvements over the last decade and the further expected increase in transit level of service relative to the automobile, it is reasonable to project moderately optimistic policy guideline modal splits for the future. These revised policy guideline modal splits are indicated in Figure 4. The figure compares these revisions with the observed 1981 modal splits and with the policy guideline modal splits shown in the current Official Plan.

d. Employment Levels in the Central Area

The current Official Plan recommends that sufficient transportation services be provided in the Central Area to

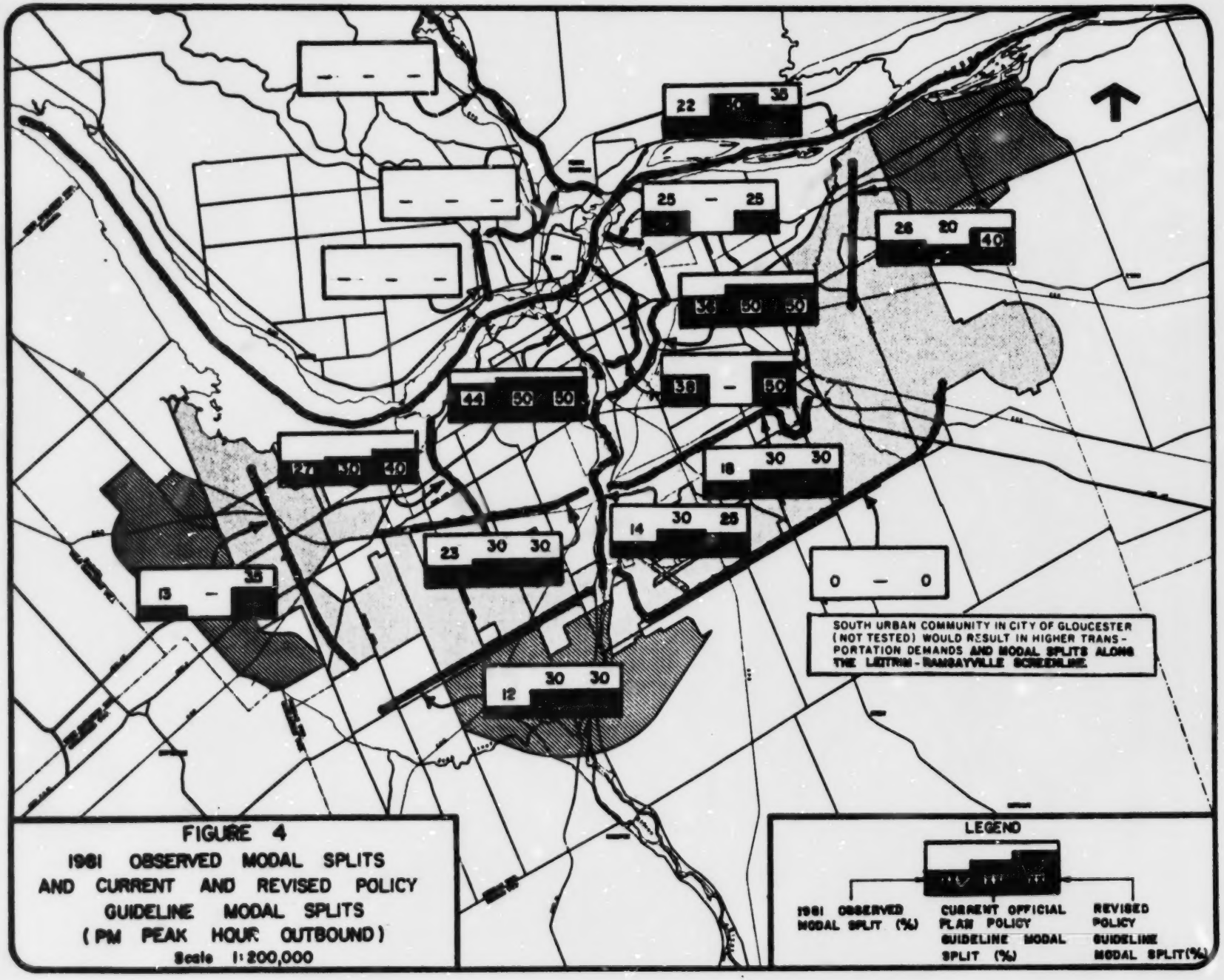

22 30 35
25 – 25
26 20 40
30 50 50
44 50 50
30 – 50
18 30 30
14 30 25
23 30 30
13 – 35
12 30 30
0 – 0
SOUTH URBAN COMMUNITY IN CITY OF GLOUCESTER (NOT TESTED) WOULD RESULT IN HIGHER TRANSPORTATION DEMANDS AND MODAL SPLITS ALONG THE LEITRIM - RAMSAYVILLE SCREENLINE.
LEGEND
1981 OBSERVED MODAL SPLIT (%)
CURRENT OFFICIAL PLAN POLICY GUIDELINE MODAL SPLIT (%)
REVISED POLICY GUIDELINE MODAL SPLIT(%)

FIGURE 4

1981 OBSERVED MODAL SPLITS AND CURRENT AND REVISED POLICY GUIDELINE MODAL SPLITS (PM PEAK HOUR OUTBOUND)

Scale 1:200,000

accommodate about 100,000 jobs in that area. The Official Plan also notes that Central Area employment above this level would have adverse effects on innner city residential communities and would conflict with other goals of the Plan.

The current Official Plan based these recommendations on a projected RMOC population of one million. Reflecting the changes in employment growth and labour force participation since the Plan was adopted, the OPR tests assumed a range of 88,000 jobs in the Central Area under the L1/L option (at an RMOC population of 623,000 in 2001) to 110,000 jobs in the Central Area under the H1/H, H4/H, H7/H options (with an RMOC population of 723,000 in 2001). There were about 67,000 jobs in the Central Area in 1981.

The test results and analysis showed that the Central Area road and transit systems proposed in the current Official Plan could support the employment levels tested, as long as the revised policy guideline modal splits were

achieved. If these goals were not achieved, deficiencies would occur at the Rideau Canal and Rideau River Central screenlines. (It should be remembered that some inner city improvements, such as the Nicholas- Industrial link, would be required to solved existing capacity or operational problems.)

Table 11 shows the Central Area employment levels tested and the associated afternoon peak hour travel by transit at three closest screenlines (CPR, Rideau Canal, and Rideau River Central) if the revised policy guidelines modal splits are met. Although 110,000 jobs thus may be accommodated in the Central Area under these conditions, the level of employment in the Central Area must reflect other factors, such as its effect on inner city residential communities and the Central Area parking supply. With this in mind, the transportation strategy should support employment growth in the Central Area up to the limits of all of these factors.

Option Tested	Planning Horizon	Central Area Employment	PM Peak Hour Outbound Transit Person Trips*		
			CPR	Rideau Canal	Rideau River Central
Base Year	1981	67,000	11,000**	10,000**	7,000**
H1/H	1991	90,000	14,000	15,000	11,000
H1/H	2001	110,000	16,000	17,000	13,000
H4/H	2001	110,000	17,000	17,000	13,000
H6/H	2001	96,000	16,000	15,00	12,000
H7/H	2001	110,000	17,000	16,000	12,000
H8/H	2001	88,000	16,000	15,000	12,000
L1/L	2001	88,000	15,000	15,000	12,000

* Assuming Revised Policy Guideline Modal Split (50%) is Met
** Observed 1981 Modal Split

Table 11. Central Area Employment and Transit Person Trips if Revised Policy Guideline Modal Splits are Achieved

The dispersal of employment growth in areas outside the Central Area to locations that cannot be served effectively by transit should be discouraged. Employment within the Greenbelt but outside the Central Area (and the Greater Central Area) should be clustered at transitway stations. This would encourage better utilization of the transit capacity already provided (i.e., by the transitway), since more evenly balanced peak hour travel would result. As well, the need for additional road capacity improvements in some corridors would be deferred. Growth potential exists near the Baseline, Lincoln Fields, Billings Bridge, South Keys, and Blair Road stations, as well as at Bayshore along a transitway extension to the west. Possibilities exist at the Westboro, Lebreton and Hurdman stations as well. The transportation strategy therefore should support employment growth at designated transitway stations, subject to such constraints as the availability of land, traffic impacts on adjacent intersections, parking control measures etc.

Deferment of additional road capacity improvements and better utilization of transit capacity also would result

if high employment levels were achieved in the urban communities; it is assumed that employment growth in these communities would be concentrated around the town centres.

e. Parking Levels in the Central Area

Parking is not under RMOC jurisdiction. However, parking affects the overall transportation strategy and particularly the transportation systems in the Central Area; therefore, the transportation strategy should address this issue. The demand for parking in the Central Area is dependent primarily on the type of employment and commercial activity. Parking thus may be regulated by controlling these factors (through, for example, zoning). This could be undertaken in cooperation with major central area employers, notably, the federal government. In addition, a distinction between long and short term parking should be made: The transportation strategy should support short term

parking for commercial activities in the Central Area and discourage long term parking. Finally, the Region should have some level of control over local parking policies to ensure consistency with the overall transportation strategy.

f. Growth of the Urban Communities

The East and West Urban Communities are well established. Population in the East was 23,300 in 1981, with the number of jobs at 2,300. In the West, the 1981 population was 18,500 with 7,200 jobs. A smaller amount of growth also has occurred to the south, in Nepean (Barrhaven). The 1981 population of Barrhaven was 8,700 with only 500 jobs.

Although the transportation strategy should support greater population growth inside the Greenbelt, there is insufficient available land inside the Greenbelt to accommodate the anticipated growth. Unless significant changes in zoning and densities are made in existing

residential areas, population growth must be accommodated outside the Greenbelt.

As Appendix A shows, the East and West Urban Communites were assumed to have populations in 2001 ranging from 47,000 each under the L1/L option and 70,000 each under the H1/H option to 80,000 each under the H7/H and H8/H options and 100,000 each under the H4/H and H6/H options. The evaluation of these options concluded that road and transit improvements were needed to accommodate growth in the two communities, regardless of the option implemented. (See Tables 4, 7, and 8.) The ability to limit growth in the communities thus could defer the need for some of these improvements. The transportation strategy therefore should support limits to growth in the East and West Urban Communities.

Having said that, it is obvious that additional growth (i.e., beyond that which can be accommodated inside the Greenbelt and in the East and West Urban Communities) can

only be located in the South Urban Community. Growth to the south was allocated by the current Official Plan to both south Nepean and south Gloucester, although little growth has occurred to date in south Gloucester. The transportation strategy therefore should support growth in the South Urban Community, with the exact location of this growth to be determined in a later study.

f. Sensitivity of the Service Standard (0.9 Capacity)

The "service standard" of a road refers to the traffic volume that may be accommodated at a given location on the road within a specific amount of time. It is based on the road's capacity and on the volume of traffic now using (or projected to use) that road. That is, the service standard describes a desired state of traffic flow and speed. The service standard used in the OPR is defined as the point (for each road) at which the ratio of volume to capacity is 0.9. A deficiency occurs when existing or projected volume on a road exceeds 90% of capacity. This concept is illustrated in Figure 5. At a volume to capacity (V/C) ratio of, say, 0.6 or 0.7, traffic moves smoothly and there is room to accommodate

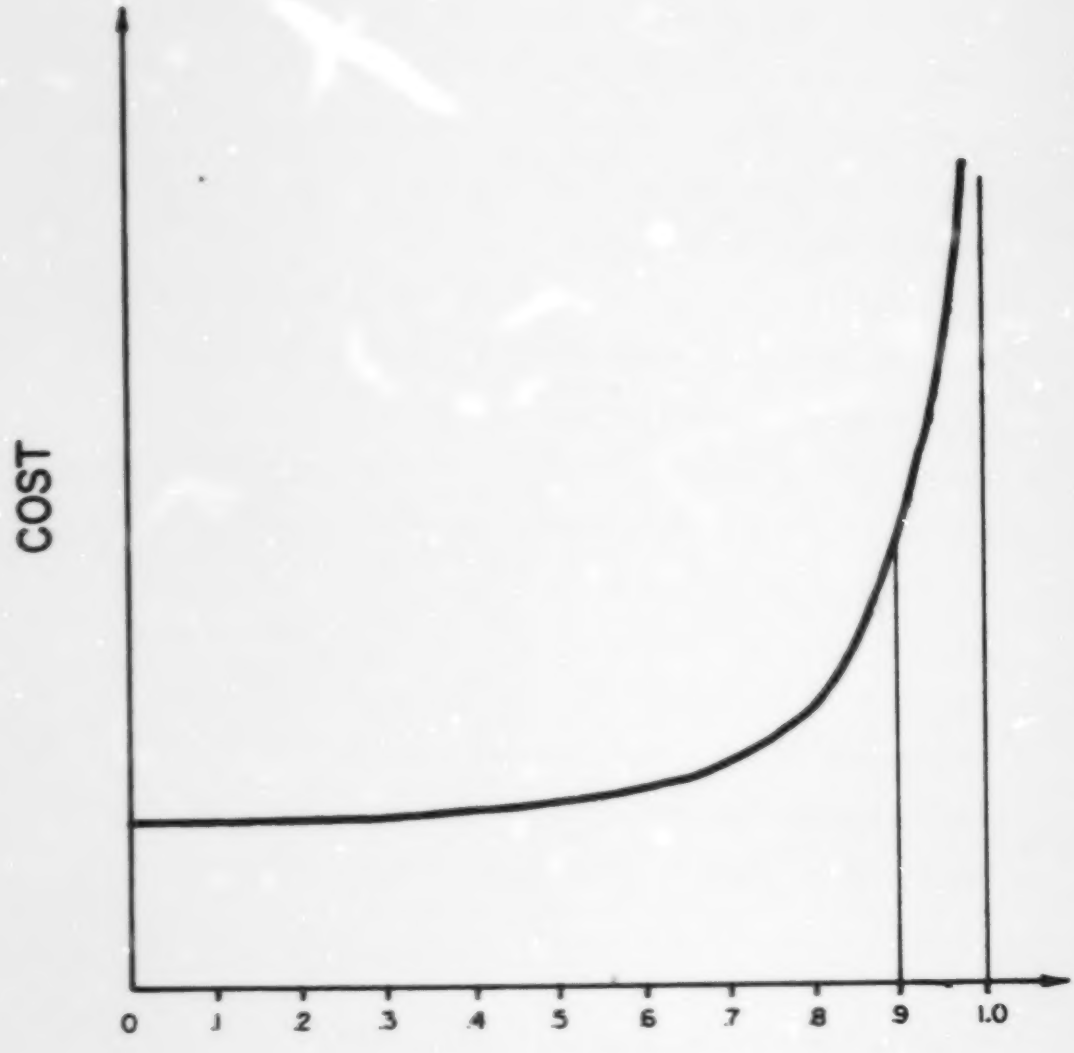


FIGURE 5 COST VERSUS VOLUME TO CAPACITY RATIO

more vehicles without disrupting flow or speed. As the V/C ratio approaches unity (volume equal to capacity) congestion and disruptions in flow increase and operating speed decreases. The effects of the various V/C ratios may be measured in terms of cost, which is seen to rise exponentially as the V/C ratio increases. Here, "cost" has many attributes: the most obvious is the monetary cost of supplying new roads. For a given volume, more facilities are required if the V/C ratio is decreased (i.e., if capacity is increased so that traffic conditions may approach an ideal state). Cost also can be measured in terms of travel time, fuel consumed, the amount of pollution generated, etc. All of these latter costs increase with congestion, that is, as the V/C ratio approaches unity. The monetary costs saved from the reduced capacity needs may not be sufficient to offset these other "costs", hence the exponential rise in "costs".

Clearly the choice of a service standard is of prime importance to the derivation of future transportation improvements. To illustrate in more concrete terms the meaning of "0.9 capacity", the reader might consider

afternoon peak hour conditions eastbound along Laurier Avenue at the Rideau Canal screenline or eastbound on Innes Road at the Green Creek screenline, both of which operated at 0.9 capacity in 1981.

Setting the service standard at 0.9 capacity allows the greatest possible flexibility in providing transportation services. If the service standard is raised, say, to 0.8 or 0.75 capacity, more construction (with an increase in the cost of supply) would be required, although improved driving conditions ultimately would result. If the service standard is lowered, say to 0.95, driving conditions deteriorate unacceptably, although the need for building or improving transportation facilities decreases. At the same time, however, the reserve capacity needed to accommodate maintenance or operational improvements decreases to an unacceptable level. The transportation strategy therefore should maintain the service standard of 0.9 capacity.

k. Proportion of Population in Rural Area

Currently, ten percent of the Region's population resides outside the urbanized area. This trend was maintained in the land use option tests, with minor variations among the rural areas. A reduction in this proportion is not considered likely, since it would require either a large decrease in the rural population or a large increase in the urban population. At the same time, any significant increase in the number of rural residents would not contribute to transit ridership since rural dwellers tend to depend more on the automobile than do urban dwellers. This in turn could result in the need for more road improvements. As well, depending on where the rural population growth is located, urbanization could occur where it is not desired. The transportation strategy therefore should maintain the current proportion of rural to urban population.

Summary

Clearly, these issues are dependent on each other. To summarize, the transportation strategy must be based on two fundamental concerns:

a. Emphasis on the achievement of the revised policy guideline modal splits. This may be done by giving precedence to transit improvements over road improvements and by concentrating employment growth to designated areas, in accordance with the Official Plan and as discussed above. The consequences of not achieving the revised policy guideline modal splits are increased needs for road improvements (i.e., the acceleration of the need for some identified improvements and the need for addtional improvements).

b. Development of a long term right of way protection policy. That is, the transportation strategy must be sufficently flexible to accommodate needs beyond the planning horizons considered in the OPR.

VI. THE TRANSPORTATION STRATEGY: SUMMARY

From the results of the land use option tests, it was apparent that a transportation strategy is needed which supports the present distributional patterns of population and employment predicated in the current Official Plan. Recent trends suggest that the current Official Plan distributions may be difficult to achieve. The transportation strategy therefore should be sufficiently flexible to accommodate such possibilities and to guide the development of the transportation system with due recognition of the inherent trade-offs among conflicting objectives arising from the major goal stated in Section 3.1.1.1 of the Official Plan.

The Official Plan Review tests and the subsequent evaluation and analysis have demonstrated the validity of Council's current policies as they apply to transportation, specifically:

a. The priority given to transit over road improvements.

b. The provision of sufficient transportation services to accommodate about 100,000 to 110,000 jobs in the Central Area.

c. The development of the East, West, and South Urban Communities.

Furthermore, the following issues are fundamental to the development of the transportation strategy:

a. Comprehensive long term right of way protection policies.

b. Revised policy guideline modal splits.

c. Transit and road improvements conducive to the attainment of these revised policy guideline modal splits.

d. Parking policies in the Central Area.

e. Employment growth in the Central Area, elsewhere inside the Greenbelt, and in the Urban Communities.

f. Population growth inside the Greenbelt and in the Urban Communities.

g. Service standards for the supply of roads.

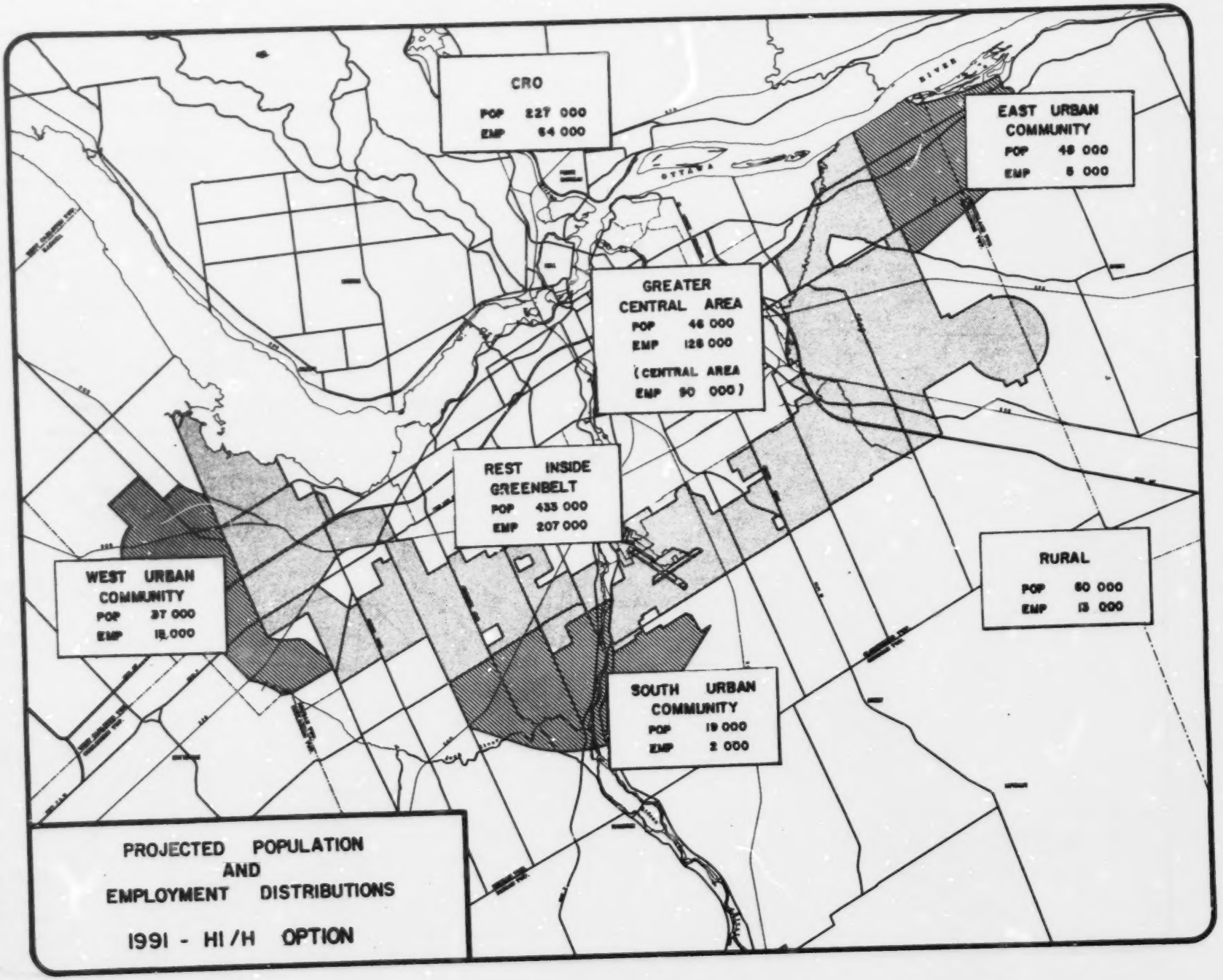
h. The proportion of rural to urban population.

Revisions to the Official Plan should consider the above policies and issues.

appendices

Appendix A

Projected Population and Employment Distributions For Each Option Tested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EMP 5 000
GREATER CENTRAL AREA
POP 46 000
EMP 128 000
(CENTRAL AREA EMP 90 000)
REST INSIDE GREENBELT
POP 435 000
EMP 207 000
WEST URBAN COMMUNITY
POP 37 000
EMP 18,000
RURAL
POP 80 000
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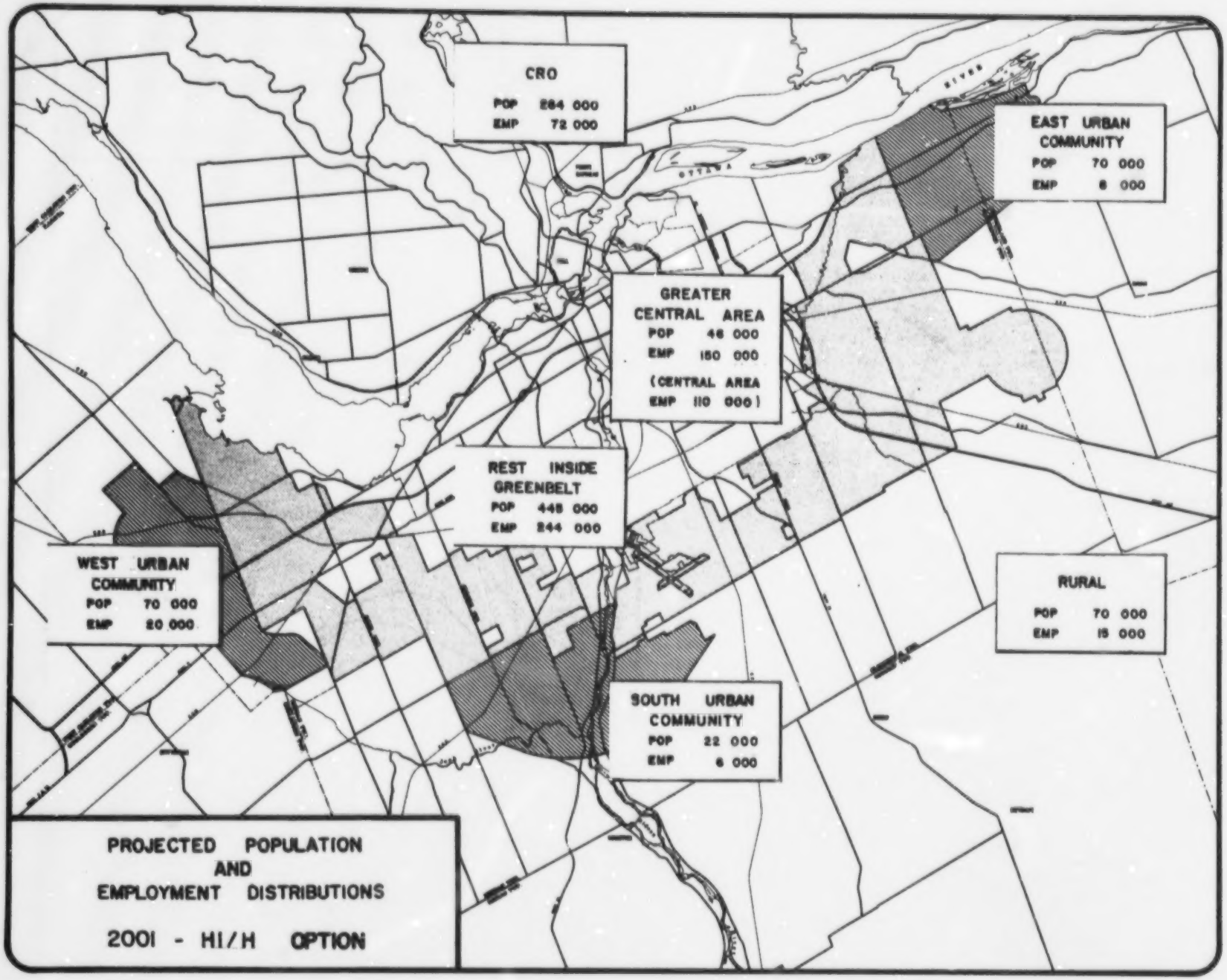
SOUTH URBAN COMMUNITY
POP 19 000
EMP 2 000
PROJECTED POPULATION AND EMPLOYMENT DISTRIBUTIONS
1991 - HI/H OPTION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(CENTRAL AREA EMP 110 000)
REST INSIDE GREENBELT
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EMP 244 000
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RURAL
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SOUTH URBAN COMMUNITY
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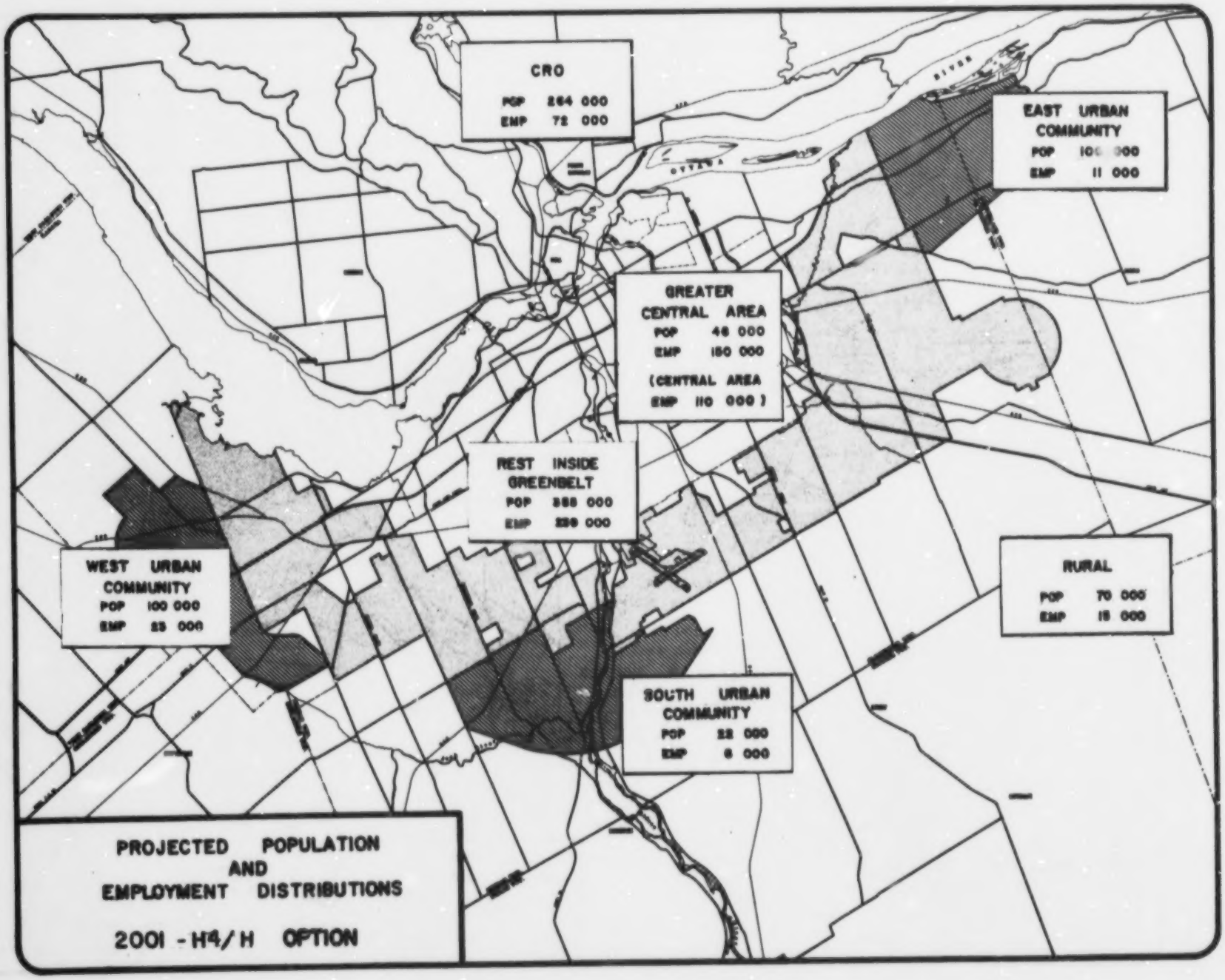
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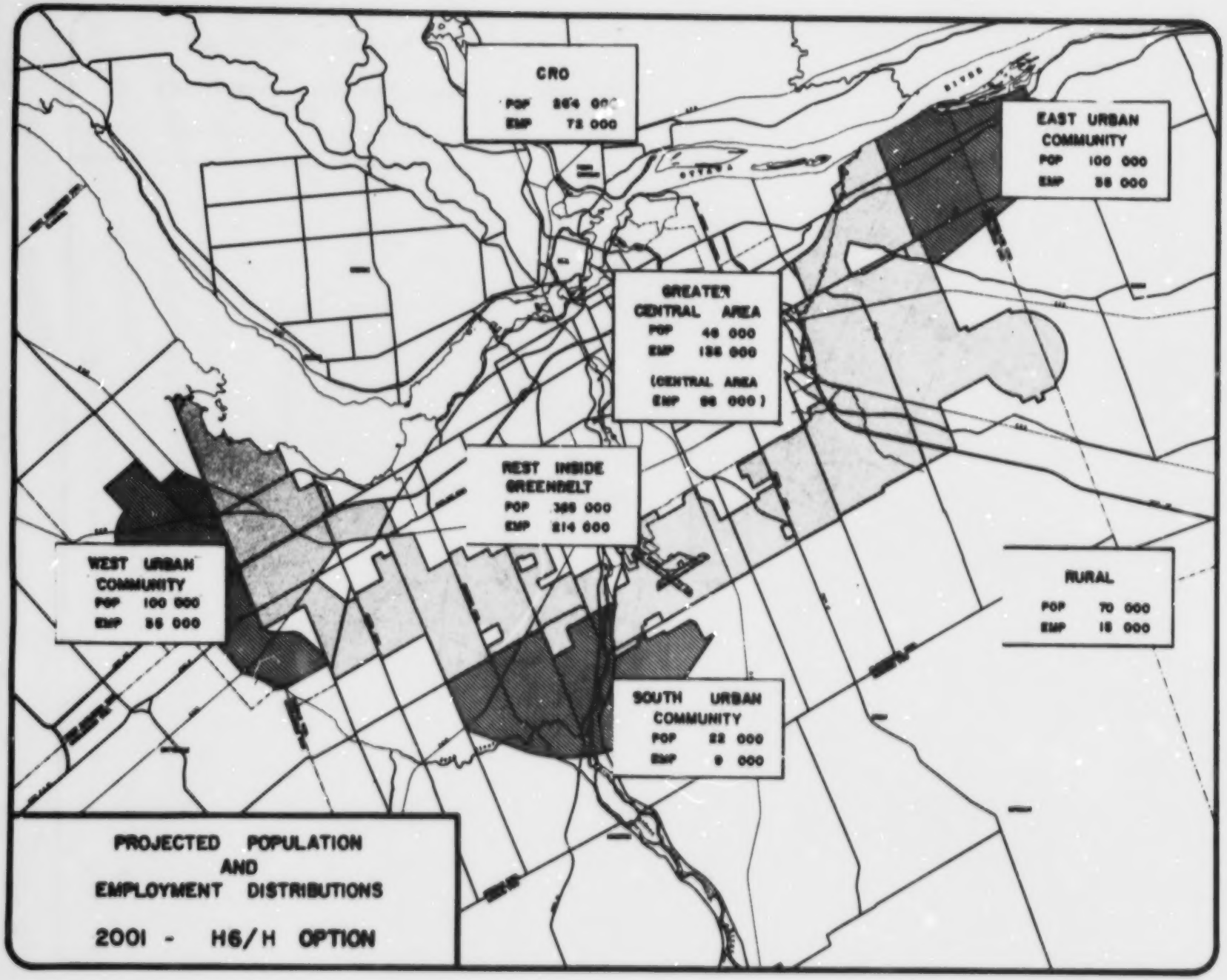
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REST INSIDE GREENBELT
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EMP 214 000
WEST URBAN COMMUNITY
POP 100 000
EMP 55 000
RURAL
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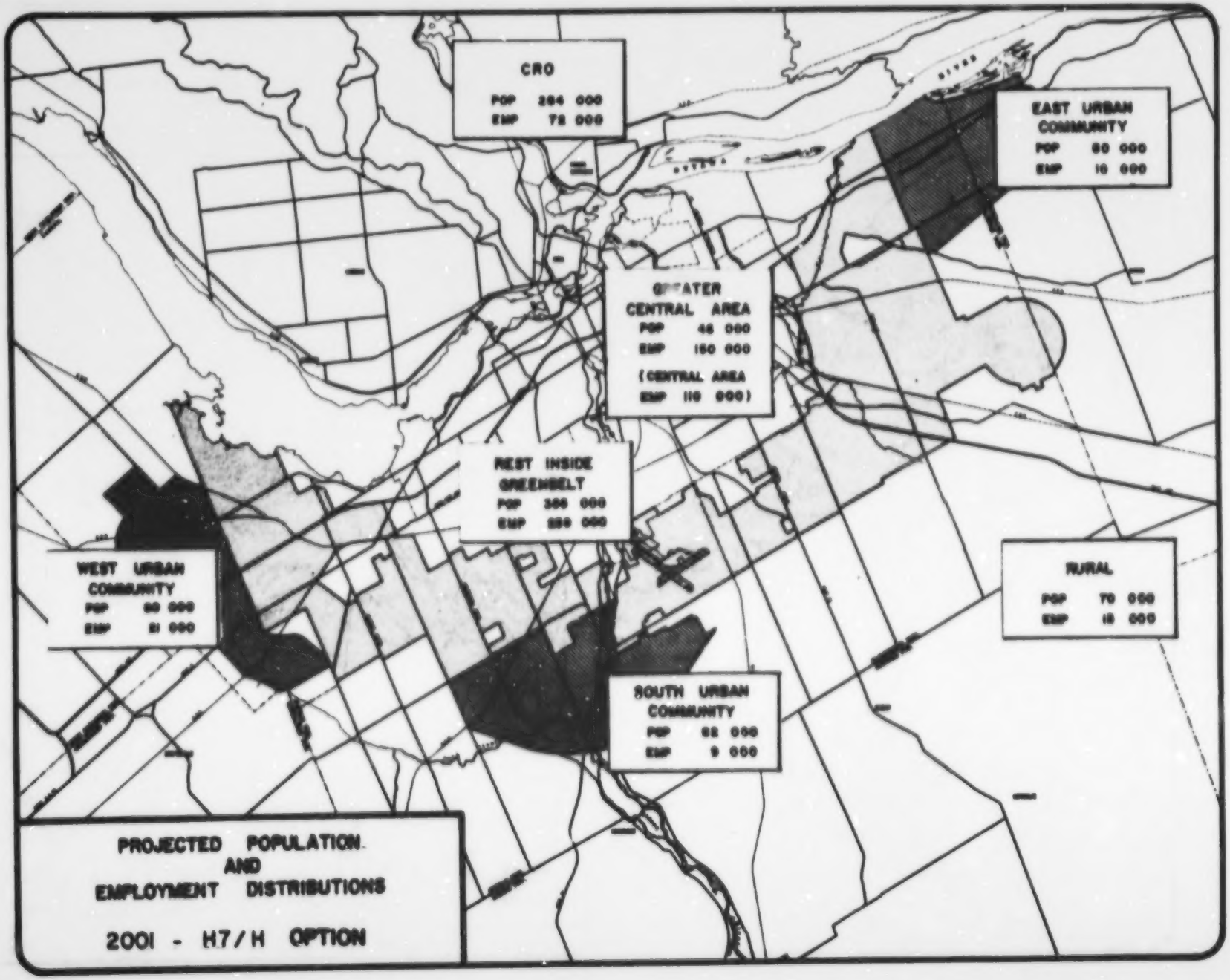
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POP 80 000
EMP 18 000
GREATER CENTRAL AREA
POP 46 000
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(CENTRAL AREA EMP 110 000)
REST INSIDE GREENBELT
POP 386 000
EMP 886 000
WEST URBAN COMMUNITY
POP 80 000
EMP 81 000
RURAL
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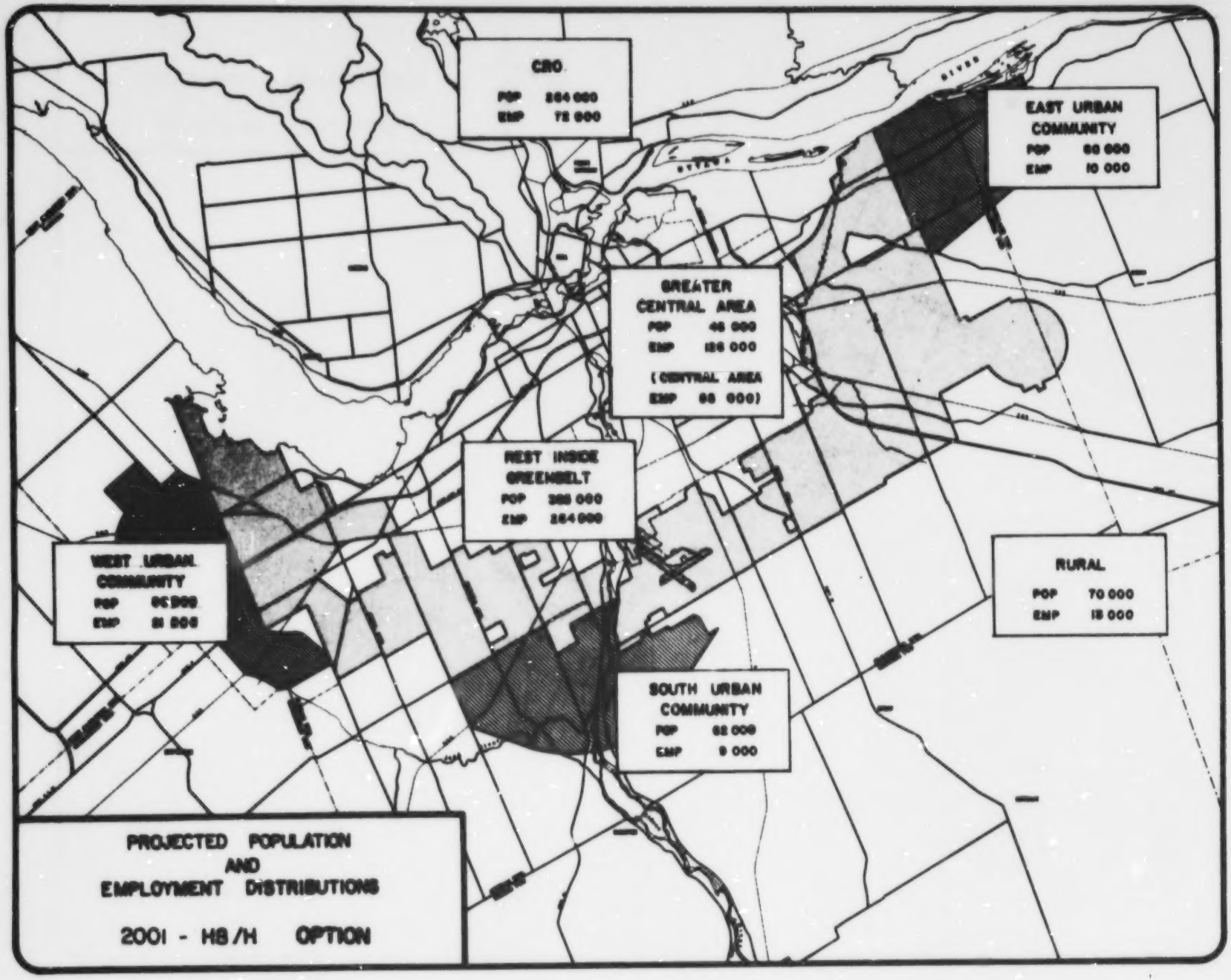
PROJECTED POPULATION AND EMPLOYMENT DISTRIBUTIONS
2001 - H7/H OPTION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(CENTRAL AREA EMP 66 000)
REST INSIDE GREENBELT
POP 388 000
EMP 264 000
WEST URBAN COMMUNITY
POP 90 000
EMP 31 000
RURAL
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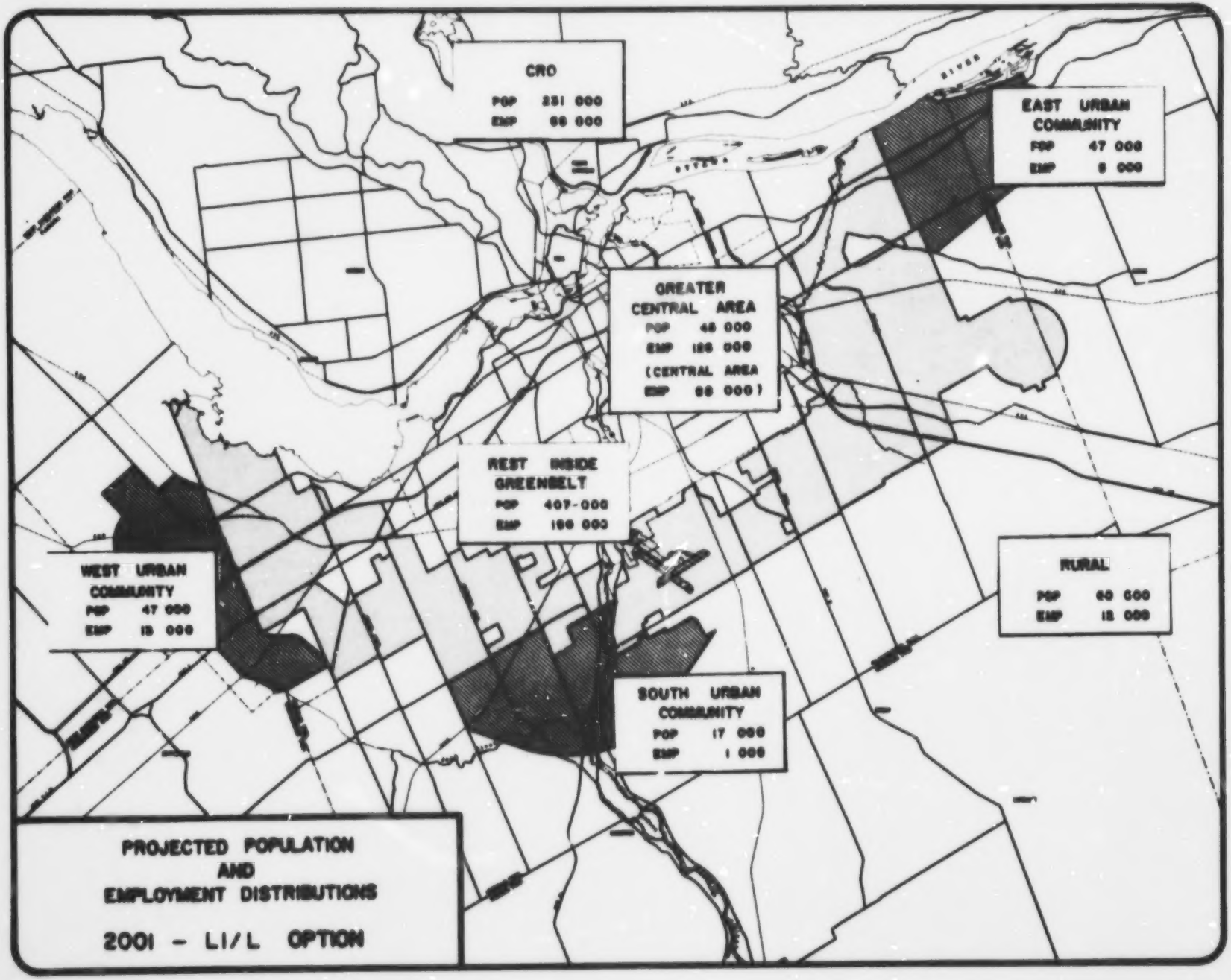
EMP 9 000
PROJECTED POPULATION AND EMPLOYMENT DISTRIBUTIONS
2001 - HB/H OPTION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REST INSIDE GREENBELT
POP 407-000
EMP 156 000
WEST URBAN COMMUNITY
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EMP 15 000
RURAL
POP 60 000
EMP 15 000
SOUTH URBAN COMMUNITY
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EMP 1 000
PROJECTED POPULATION AND EMPLOYMENT DISTRIBUTIONS
2001 - LI/L OPTION

Appendix B

Modal Split and System Efficiency (V/C) by Screenline: Data Summaries

Travel data for 1981 and for each option tested are presented (24 hour person trips, PM peak hour auto vehicle trips, and PM peak hour transit person trips). Capacities at each planning horizon are listed, as are PM peak hour volume to capacity ratios. Deficiencies (ΔC) in vehicles per hour are calculated where the V/C ratio exceeds the service standard of 0.9 capacity. Finally, the observed 1981 modal split, the simulated modal splits, and the revised policy guideline modal split are presented for each screenline. The reader should note that all numbers have been rounded and that therefore some modal splits and volume to capacity ratios may not be exact.

Case	Year	24 Hour Person Trips (Two-way)	PM Peak Hour Auto Vehicle Trips (Outbound)	PM Peak Hour Transit Person Trips (Outbound)	PM Peak Hour Auto Vehicle Capacity (Outbound)	Volume to Capacity Ratio	C=V/.9	ΔC (deficiencies)
Base Year	1981	74000	1600	800	2600	0.42	N/A	N/A
H1/H	1991	87000	2500	900	4300	0.58	N/A	N/A
H1/H	2001	100000	2900	1000	4300	0.67	N/A	N/A
L1/L	2001	88000	2700	1000	4300	0.63	N/A	N/A
H4/H	2001	98000	2800	1000	4300	0.65	N/A	N/A
H7/H	2001	96000	2600	1000	4300	0.60	N/A	N/A
H6/H	2001	94000	2700	900	4300	0.63	N/A	N/A
H8/H	2001	95000	2600	1100	4300	0.60	N/A	N/A

N/A - Not Applicable

1981 Observed PM Peak Hour Outbound Modal Split: 25%

Simulated Future PM Peak Hour Outbound Modal Split: 25%

Revised Policy Guideline Modal Split: 25%

MODAL SPLIT AND SYSTEM EFFICIENCY (V/C) DATA

RIDEAU RIVER NORTH SCREENLINE

Case	Year	24 Hour Person Trips (Two-way)	PM Peak Hour Auto Vehicle Trips (Outbound)	PM Peak Hour Transit Person Trips (Outbound)	PM Peak Hour Auto Vehicle Capacity (Outbound)	Volume to Capacity Ratio	C=V/.9	ΔC (deficiencies)
Base Year	1981	296000	8300	6800	9600	0.86	N/A	N/A
HI/H	1991	349000	9600	8200	10600	0.91	10700	100
HI/H	2001	400000	10900	9300	10600	1.03	12100	1500
LI/L	2001	352000	9900	8600	10600	0.93	11000	400
H4/H	2001	394000	10900	9200	10600	1.03	12100	1500
H7/H	2001	383000	10400	8700	10600	0.98	11600	1000
H6/H	2001	378000	10200	8300	10600	0.96	11300	700
H8/H	2001	380000	10200	9700	10600	0.96	11300	700

N/A - Not Applicable

1981 Observed PM Peak Hour Outbound Modal Split: 36%

Simulated Future PM Peak Hour Outbound Modal Split: 37-38%

Revised Policy Guideline Modal Split: 50%

MODAL SPLIT AND SYSTEM EFFICIENCY (V/C) DATA

RIDEAU RIVER CENTRAL SCREENLINE

Case	Year	24 Hour Person Trips (Two-way)	PM Peak Hour Auto Vehicle Trips (Outbound)	PM Peak Hour Transit Person Trips (Outbound)	PM Peak Hour Auto Vehicle Capacity (Outbound)	Volume to Capacity Ratio	C=V/.9	ΔC (deficiencies
Base Year	1981	78000	2800	700	3100	0.90	N/A	N/A
HI/H	1991	111000	3900	900	5600	0.70	N/A	N/A
HI/H	2001	130000	4600	1100	5600	0.82	N/A	N/A
LI/L	2001	108000	3800	900	5600	0.68	N/A	N/A
H4/H	2001	122000	4500	1100	5600	0.80	N/A	N/A
H7/H	2001	134000	5000	1500	5600	0.89	N/A	N/A
H6/H	2001	118000	4200	1100	5600	0.75	N/A	N/A
H8/H	2001	140000	5400	1400	5600	0.96	6000	400

N/A - Not Applicable

1981 Observed PM Peak Hour Outbound Modal Split: 14%

Simulated Future PM Peak Hour Outbound Modal Split: 14-17%

Revised Policy Guideline Modal Split: 25%

MODAL SPLIT AND SYSTEM EFFICIENCY (V/C) DATA

RIDEAU RIVER SOUTH SCREENLINE

Case	Year	24 Hour Person Trips (Two-way)	PM Peak Hour Auto Vehicle Trips (Outbound)	PM Peak Hour Transit Person Trips (Outbound)	PM Peak Hour Auto Vehicle Capacity (Outbound)	Volume to Capacity Ratio	C=V/.9	ΔC (deficiencies
Base Year	1981	390000	11100	9900	13000	0.85	N/A	N/A
HI/H	1991	442000	12700	11200	13800	0.92	14100	300
HI/H	2001	501000	14600	12700	13800	1.06	16200	2400
LI/L	2001	444000	13000	11500	13800	0.94	14400	600
H4/H	2001	491000	14200	12400	13800	1.03	15800	2000
H7/H	2001	488000	14400	12000	13800	1.04	16000	2200
H6/H	2001	467000	13000	11300	13800	0.94	14400	600
H8/H	2001	470000	13200	11200	13800	0.94	14700	900

N/A - Not Applicable

1981 Observed PM Peak Hour Outbound Modal Split: 38%

Simulated Future PM Peak Hour Outbound Modal Split: 38-39%

Revised Policy Guideline Modal Split: 50%

MODAL SPLIT AND SYSTEM EFFICIENCY (V/C) DATA

RIDEAU CANAL SCREENLINE

Case	Year	24 Hour Person Trips (Two-way)	PM Peak Hour Auto Vehicle Trips (Outbound)	PM Peak Hour Transit Person Trips (Outbound)	PM Peak Hour Auto Vehicle Capacity (Outbound)	Volume to Capacity Ratio	C=V/.9	ΔC (deficiencies
Base Year	1981	72000	3200	800	5300	0.60	N/A	N/A
H1/H	1991	101000	4200	1600	5800	0.72	N/A	N/A
H1/H	2001	139000	6700	3500	7700	0.87	N/A	N/A
L1/L	2001	104000	4900	2000	7700	0.64	N/A	N/A
H4/H	2001	151000	7600	5000	7700	0.99	8400	700
H7/H	2001	139000	6700	4000	7700	0.87	N/A	N/A
H6/H	2001	145000	6700	3800	7700	0.87	N/A	N/A
H8/H	2001	138000	6900	3800	7700	0.90	N/A	N/A

N/A - Not applicable

1981 Observed PM Peak Hour Outbound Modal Split: 13%

Simulated Future PM Peak Hour Outbound Modal Split: 20-30%

Revised Policy Guideline Modal Split: 35%

MODAL SPLIT AND SYSTEM EFFICIENCY (V/C) DATA

EAGLESON SIDE ROAD SCREENLINE

Case	Year	24 Hour Person Trips (Two-way)	PM Peak Hour Auto Vehicle Trips (Outbound)	PM Peak Hour Transit Person Trips (Outbound)	PM Peak Hour Auto Vehicle Capacity (Outbound)	Volume to Capacity Ratio	C=V/.9	ΔC (deficiencies
Base Year	1981	172000	7000	3900	7900	0.89	N/A	N/A
HI/H	1991	242000	10500	4600	8300	1.27	11700	2400
HI/H	2001	283000	13000	5900	9300	1.40	14400	5100
LI/L	2001	240000	10900	4800	9300	1.17	12100	2800
H4/H	2001	288000	13400	6800	9300	1.44	14900	5600
H7/H	2001	274000	12700	6100	9300	1.37	14100	4800
H6/H	2001	278000	12700	5900	9300	1.37	14100	4800
H8/H	2001	297000	12600	5700	9300	1.35	14000	4700

N/A - Not Applicable

1981 Observed PM Peak Hour Outbound Modal Split: 27%

Simulated Future PM Peak Hour Outbound Modal Split: 27-28%

Revised Policy Guideline Modal Split: 40%

MODAL SPLIT AND SYSTEM EFFICIENCY (V/C) DATA

WESTERN PARKWAY-WOODROFFE SCREENLINE

Case	Year	24 Hour Person Trips (Two-way)	PM Peak Hour Auto Vehicle Trips (Outbound)	PM Peak Hour Transit Person Trips (Outbound)	PM Peak Hour Auto Vehicle Capacity (Outbound)	Volume to Capacity Ratio	C=V/.9	ΔC (deficiencies
Base Year	1981	289000	9200	11000	12400	0.74	N/A	N/A
HI/H	1991	340000	10700	13100	13400	0.80	N/A	N/A
HI/H	2001	383000	12200	14800	13400	0.91	13600	200
LI/L	2001	336000	10700	13800	13400	0.80	N/A	N/A
H4/H	2001	395000	12300	15300	13400	0.92	13700	300
H7/H	2001	386000	12900	15600	13400	0.96	14300	900
H6/H	2001	373000	11900	14400	13400	0.89	N/A	N/A
H8/H	2001	376000	11900	14900	13400	0.89	N/A	N/A

N/A - Not Applicable

1981 Observed PM Peak Hour Outbound Modal Split: 44%

Simulated Future PM Peak Hour Outbound Modal Split: 44-45%

Revised Policy Guideline Modal Split: 50%

MODAL SPLIT AND SYSTEM EFFICIENCY (V/C) DATA

CPR SCREENLINE

Case	Year	24 Hour Person Trips (Two-way)	PM Peak Hour Auto Vehicle Trips (Outbound)	PM Peak Hour Transit Person Trips (Outbound)	PM Peak Hour Auto Vehicle Capacity (Outbound)	Volume to Capacity Ratio	C=V/.9	ΔC (deficiencies)
Base Year	1981	69000	3200	1700	5000	0.64	N/A	N/A
HI/H	1991	106000	5200	3100	5200	1.00	5800	600
HI/H	2001	139000	7000	4300	5200	1.35	7800	2600
LI/L	2001	116000	5700	3500	5200	1.10	6300	1100
H4/H	2001	165000	8300	5600	5200	1.62	9300	4100
H7/H	2001	145000	7100	4600	5200	1.38	8000	2800
H6/H	2001	147000	6000	3500	5200	1.17	6800	1600
H8/H	2001	145000	7300	4500	5200	1.40	8100	2900

N/A - Not Applicable

1981 Observed PM Peak Hour Outbound Modal Split: 26%

Simulated Future PM Peak Hour Outbound Modal Split: 28-31%

Revised Policy Guideline Modal Split: 40%

MODAL SPLIT AND SYSTEM EFFICIENCY (V/C) DATA

GREEN CREEK SCREENLINE

Case	Year	24 Hour Person Trips (Two-way)	PM Peak Hour Auto Vehicle Trips (Outbound)	PM Peak Hour Transit Person Trips (Outbound)	PM Peak Hour Auto Vehicle Capacity (Outbound)	Volume to Capacity Ratio	C=V/.9	ΔC (deficiencies
Base Year	1981	113000	3700	1700	5100	0.73	N/A	N/A
HI/H	1991	149000	4900	2100	5100	0.96	N/A	N/A
HI/H	2001	167000	5400	2300	7800	0.69	N/A	N/A
LI/L	2001	144000	5000	2200	7800	0.64	N/A	N/A
H4/H	2001	162000	5100	2300	7800	0.65	N/A	N/A
H7/H	2001	190000	7100	3600	7800	0.91	7900	100
H6/H	2001	160000	4800	2300	7800	0.62	N/A	N/A
H8/H	2001	190000	6100	3600	7800	0.78	N/A	N/A

N/A - Not Applicable

1981 Observed PM Peak Hour Outbound Modal Split: 23%

Simulated Future PM Peak Hour Outbound Modal Split: 23-25%

Revised Policy Guideline Modal Split: 30%

MODAL SPLIT AND SYSTEM EFFICIENCY (V/C) DATA

CNR WEST SCREENLINE

Case	Year	24 Hour Person Trips (Two-way)	PM Peak Hour Auto Vehicle Trips (Outbound)	PM Peak Hour Transit Person Trips (Outbound)	PM Peak Hour Auto Vehicle Capacity (Outbound)	Volume to Capacity Ratio	C=V/.9	ΔC (deficiencies
Base Year	1981	50000	1800	400	4800	0.38	N/A	N/A
HI/H	1991	85000	2900	800	4800	0.60	N/A	N/A
HI/H	2001	102000	3300	900	7100	0.46	N/A	N/A
LI/L	2001	80000	2900	800	7100	0.41	N/A	N/A
H4/H	2001	99000	3200	900	7100	0.45	N/A	N/A
H7/H	2001	150000	6300	1800	7100	0.89	N/A	N/A
H6/H	2001	102000	3000	1000	7100	0.42	N/A	N/A
H8/H	2001	146000	5100	2100	7100	0.72	N/A	N/A

N/A - Not Applicable

1981 Observed PM Peak Hour Outbound Modal Split: 12%

Simulated Future PM Peak Hour Outbound Modal Split: 15-17%

Revised Policy Guideline Modal Split: 30%

MODAL SPLIT AND SYSTEM EFFICIENCY (V/C) DATA

FALLOWFIELD ROAD SCREENLINE

Case	Year	24 Hour Person Trips (Two-way)	PM Peak Hour Auto Vehicle Trips (Outbound)	PM Peak Hour Transit Person Trips (Outbound)	PM Peak Hour Auto Vehicle Capacity (Outbound)	Volume to Capacity Ratio	C=V/.9	ΔC (deficiencies
Base Year	1981	94000	2500	800	5000	0.50	N/A	N/A
HI/H	1991	130000	3700	1400	5000	0.74	N/A	N/A
HI/H	2001	174000	4700	1800	5000	0.94	5200	200
LI/L	2001	134000	3900	1500	5000	0.78	N/A	N/A
H4/H	2001	144000	3600	1400	5000	0.72	N/A	N/A
H7/H	2001	153000	4200	1800	5000	0.84	N/A	N/A
H6/H	2001	139000	3500	1500	5000	0.70	N/A	N/A
H8/H	2001	159000	4000	1900	5000	0.80	N/A	N/A

N/A - Not Applicable

1981 Observed PM Peak Hour Outbound Modal Split: 18%

Simulated Future PM Peak Hour Outbound Modal Split: 21-23%

Revised Policy Guideline Modal Split: 30%

MODAL SPLIT AND SYSTEM EFFICIENCY (V/C) DATA

CNR EAST - WALKLEY ROAD SCREENLINE

Case	Year	24 Hour Person Trips (Two-way)	PM Peak Hour Auto Vehicle Trips (Outbound)	PM Peak Hour Transit Person Trips (Outbound)	PM Peak Hour Auto Vehicle Capacity (Outbound)	Volume to Capacity Ratio	C=V/.9	ΔC (deficiencies
Base Year	1981	51000	2100	0	9600	0.21	N/A	N/A
HI/H	1991	60000	2500	0	9600	0.26	N/A	N/A
HI/H	2001	70000	2900	0	9600	0.30	N/A	N/A
LI/L	2001	59000	2400	0	9600	0.27	N/A	N/A
H4/H	2001	67000	2700	0	9600	0.28	N/A	N/A
H7/H	2001	66000	2700	0	9600	0.28	N/A	N/A
H6/H	2001	66000	2600	0	9600	0.27	N/A	N/A
H8/H	2001	66000	2700	0	9600	0.28	N/A	N/A

N/A - Not Applicable

1981 Observed PM Peak Hour Outbound Modal Split: 0

Simulated Future PM Peak Hour Outbound Modal Split: 0

Revised Policy Guideline Modal Split: 0

MODAL SPLIT AND SYSTEM EFFICIENCY (V/C) DATA

LEITRIM - RAMSAYVILLE SCREENLINE

Case	Year	24 Hour Person Trips (Two-way)	PM Peak Hour Auto Vehicle Trips (Outbound)	PM Peak Hour Transit Person Trips (Outbound)	PM Peak Hour Auto Vehicle Capacity (Outbound)	Volume to Capacity Ratio	C=V/.9	ΔC (deficiencies
Base Year	1981	182000	6400	2700	9800	0.64	N/A	N/A
H1/H	1991	221000	8100	3200	11200	0.72	N/A	N/A
H1/H	2001	262000	9800	3800	11200	0.88	N/A	N/A
L1/L	2001	224000	7900	3100	11200	0.71	N/A	N/A
H4/H	2001	262000	9800	3800	11200	0.88	N/A	N/A
H7/H	2001	261000	9800	3800	11200	0.88	N/A	N/A
H6/H	2001	257000	9900	3700	11200	0.88	N/A	N/A
H8/H	2001	261000	9900	3800	11200	0.88	N/A	N/A

N/A - Not Applicable

1981 Observed PM Peak Hour Outbound Modal Split: 22%

Simulated Future PM Peak Hour Outbound Modal Split: 22%

Revised Policy Guideline Modal Split: 35%

MODAL SPLIT AND SYSTEM EFFICIENCY (V/C) DATA

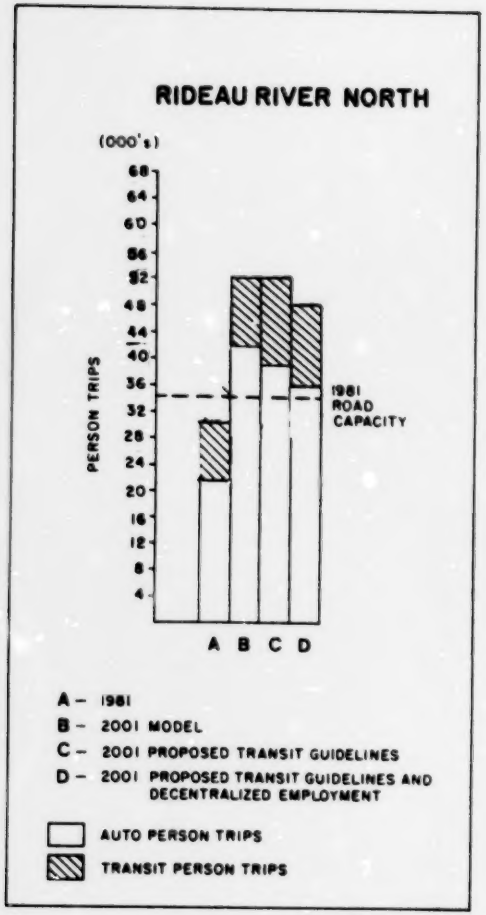
OTTAWA RIVER SCREENLINE

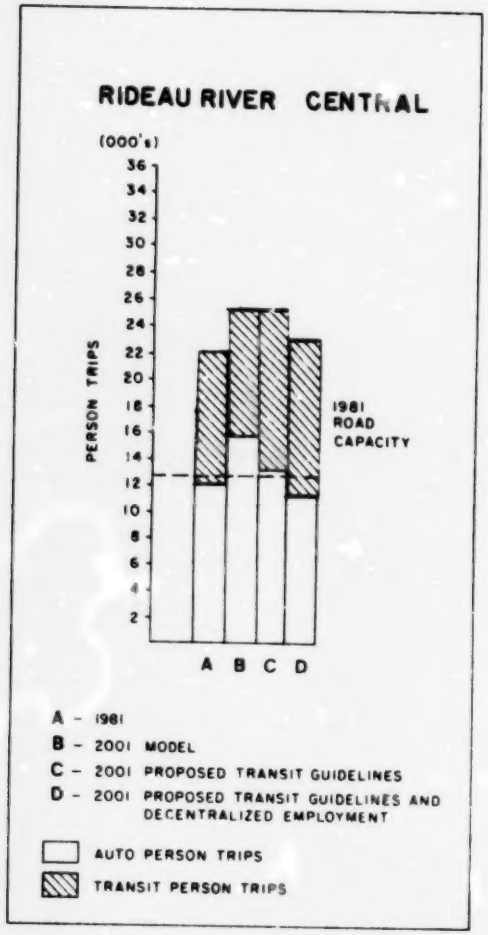
Appendix C

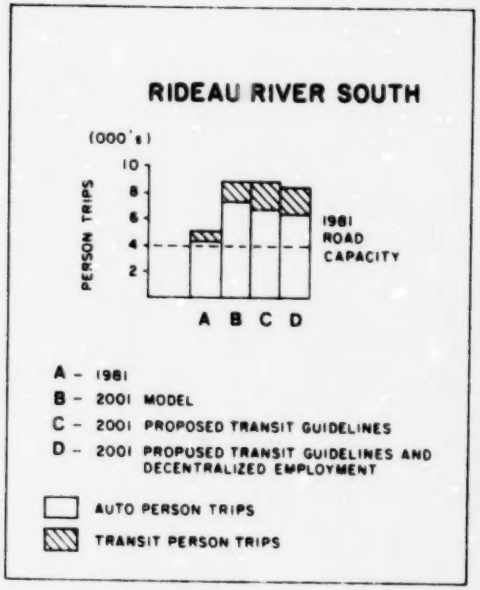
Modal Split and System Efficiency (V/C) by Screenline: Graphical Representation of Selected Data

The 1981 "worst case" 2001 PM peak hour travel data are presented by mode (bars A and B). The implications of achieving the revised guideline modal splits under the "worst case" and "decentralized employment" options are presented in bars C and D. All are compared with existing (i.e., 1981) screenline road capacity.

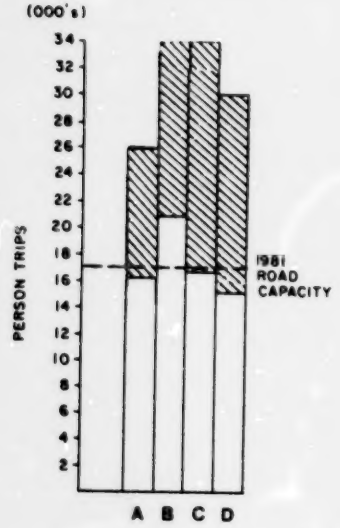
Note: These graphs are revised versions of the graphs presented in Appendix 5, Figure 3, of the Regional Development Strategy and should be considered with reference to that document.


RIDEAU RIVER NORTH
(000's)
PERSON TRIPS
1981 ROAD CAPACITY
A B C D
A – 1981
B – 2001 MODEL
C – 2001 PROPOSED TRANSIT GUIDELINES
D – 2001 PROPOSED TRANSIT GUIDELINES AND DECENTRALIZED EMPLOYMENT
AUTO PERSON TRIPS
TRANSIT PERSON TRIPS


RIDEAU RIVER CENTRAL
(000's)
PERSON TRIPS
1981 ROAD CAPACITY
A B C D
A – 1981
B – 2001 MODEL
C – 2001 PROPOSED TRANSIT GUIDELINES
D – 2001 PROPOSED TRANSIT GUIDELINES AND DECENTRALIZED EMPLOYMENT
AUTO PERSON TRIPS
TRANSIT PERSON TRIPS


RIDEAU RIVER SOUTH
(000's)
PERSON TRIPS
1981 ROAD CAPACITY
A B C D
A – 1981
B – 2001 MODEL
C – 2001 PROPOSED TRANSIT GUIDELINES
D – 2001 PROPOSED TRANSIT GUIDELINES AND DECENTRALIZED EMPLOYMENT
AUTO PERSON TRIPS
TRANSIT PERSON TRIPS

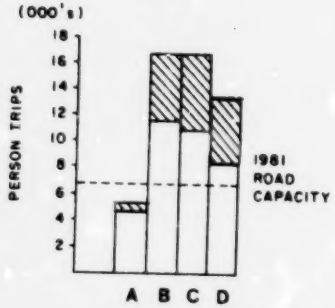
RIDEAU CANAL



A – 1981
B – 2001 MODEL
C – 2001 PROPOSED TRANSIT GUIDELINES
D – 2001 PROPOSED TRANSIT GUIDELINES AND DECENTRALIZED EMPLOYMENT

AUTO PERSON TRIPS
TRANSIT PERSON TRIPS

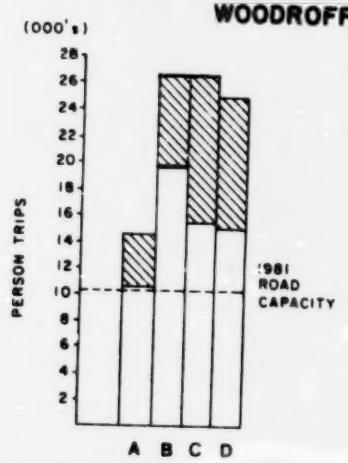
EAGLESON



A – 1981
B – 2001 MODEL
C – 2001 PROPOSED TRANSIT GUIDELINES
D – 2001 PROPOSED TRANSIT GUIDELINES AND DECENTRALIZED EMPLOYMENT

AUTO PERSON TRIPS
TRANSIT PERSON TRIPS

WESTERN PARKWAY – WOODROFFE



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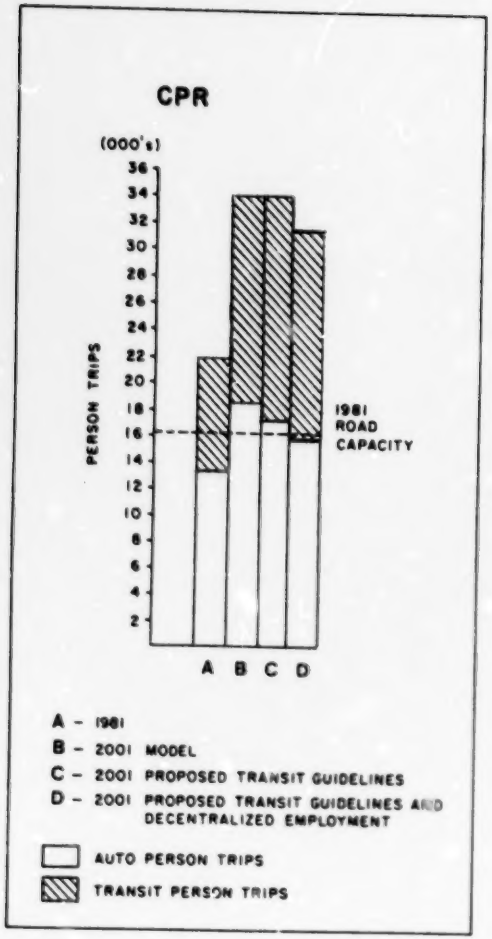
AUTO PERSON TRIPS
TRANSIT PERSON TRIPS

COMBINATION OF 100,000 IN KANATA AND EARLY SOUTH URBAN COMMUNITY (NOT TESTED) WOULD RESULT IN HIGHER TRANSPORTATION DEMANDS.


CPR
(000's)
PERSON TRIPS
1981 ROAD CAPACITY
A B C D
A - 1981
B - 2001 MODEL
C - 2001 PROPOSED TRANSIT GUIDELINES
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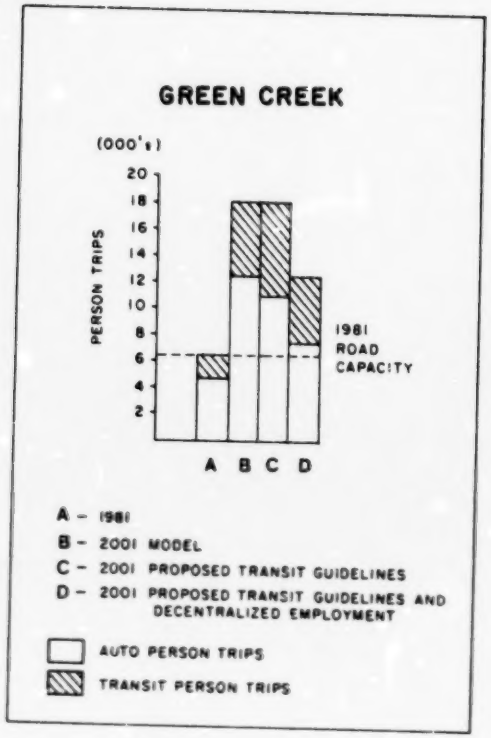
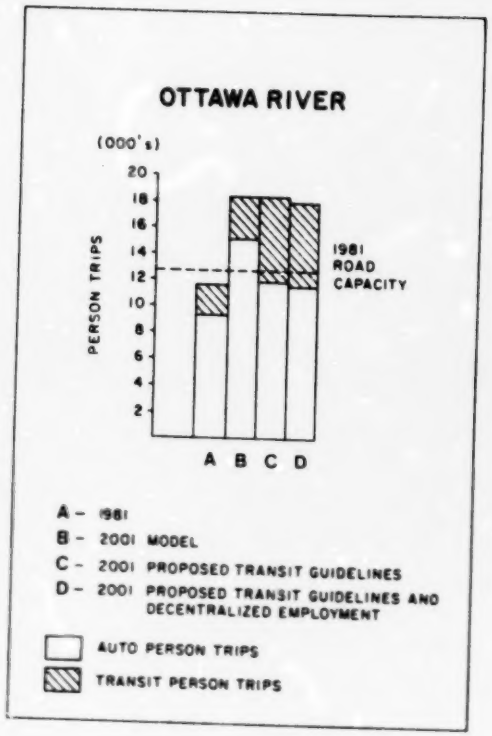
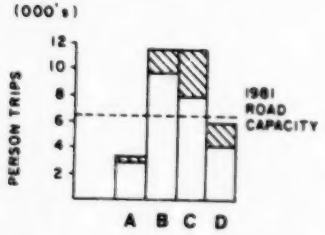
AUTO PERSON TRIPS
TRANSIT PERSON TRIPS


GREEN CREEK
(000's)
PERSON TRIPS
1981 ROAD CAPACITY
A B C D
A - 1981
B - 2001 MODEL
C - 2001 PROPOSED TRANSIT GUIDELINES
D - 2001 PROPOSED TRANSIT GUIDELINES AND DECENTRALIZED EMPLOYMENT
AUTO PERSON TRIPS
TRANSIT PERSON TRIPS


OTTAWA RIVER
(000's)
PERSON TRIPS
1981 ROAD CAPACITY
A B C D
A - 1981
B - 2001 MODEL
C - 2001 PROPOSED TRANSIT GUIDELINES
D - 2001 PROPOSED TRANSIT GUIDELINES AND DECENTRALIZED EMPLOYMENT
AUTO PERSON TRIPS
TRANSIT PERSON TRIPS

FALLOWFIELD



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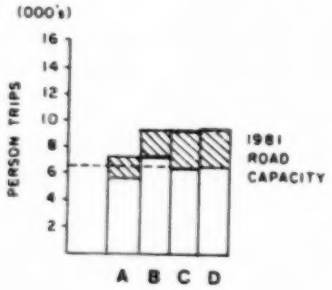
AUTO PERSON TRIPS
TRANSIT PERSON TRIPS

CNR WEST



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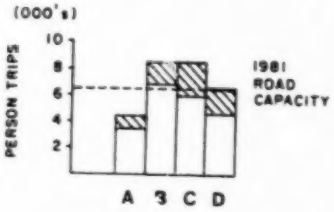
AUTO PERSON TRIPS
TRANSIT PERSON TRIPS

CNR EAST



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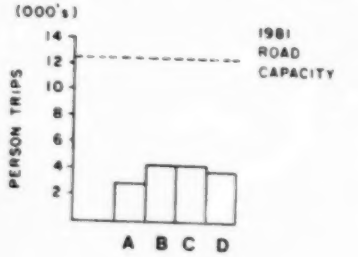
AUTO PERSON TRIPS
TRANSIT PERSON TRIPS

SOUTH URBAN COMMUNITY IN CITY OF GLOUCESTER (NOT TESTED) WOULD RESULT IN HIGHER TRANSPORTATION DEMANDS.

LEITRIM-RAMSAYVILLE



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